



## SPECIAL REPORT

# Nutrition and Health Survey of Underfive Children and Women in West Timor 2007

## Need for Immediate Action in West Timor



West Timor continues to face a combination of acute and chronic food-security crises that leads to deteriorating nutritional and health status of its population, particularly underfive children and women. In order to assess the magnitude of nutrition, health and food security problems, CWS, CARE, and HKI initiated a nutrition and health survey in West Timor (districts of Kupang, Timur Tengah Selatan, Timur Tengah Utara, and Belu), East Nusa Tenggara province in November-December 2007. The survey was funded by UN OCHA and UNICEF. The survey found a high prevalence of acute malnutrition (13.1% wasting), a very high prevalence of chronic malnutrition (61.1% stunting) and a very high prevalence of underweight (47.8%)

across the districts. Anemia among children almost reached 60%, which is also very alarming and a severe public health problem.<sup>1</sup> The prevalence of thinness and anemia among non-pregnant women were also high (24.0% and 35.8%, respectively). These findings show a 'serious' to 'critical' nutrition situation, of a combined acute and chronic nature.<sup>2</sup> Underlying factors include insufficient intake of adequate quality food, household food insecurity and diseases. Improved and focused strategic and programmatic planning, and systematic monitoring and evaluation are critical to improving the nutrition and food security situation in West Timor.

### INTRODUCTION

West Timor, the Indonesian half of the island of Timor and a part of the country's Nusa Tenggara Timur (NTT) Province, is highly prone to natural disasters. The impact of severe and prolonged drought has reduced food crop output, which has led to food insecurity at the household level and thus reduced food intake, eroding the nutrition and health status of its population. Comparisons with previous assessments in the district of Timur Tengah Selatan (TTS),<sup>3,4</sup> conducted by Church World Service (CWS) and Helen Keller International (HKI) have revealed that the prevalence of wasting among preschool children and thinness among non-pregnant women has increased substantially within the past year, signifying that both acute and chronic malnutrition are significant public health problems in TTS. In addition, monitoring data from CARE's PULIH project<sup>a</sup> in the districts of Timur Tengah Utara (TTU) and Belu have shown the situation to be severe, with an increase of almost 100% in the prevalence of wasting between Nov 2006 and Jan 2007. These findings suggest that several parts of West Timor are facing serious public health problems; more data are needed, however, to ascertain the situation throughout the Indonesian half of the island. In response, CWS, CARE, and HKI initiated a nutrition and health survey in four rural districts in West Timor (Kupang, TTS, TTU, and Belu) in November-December 2007.

This bulletin highlights findings on the nutrition, health and food security situation in West Timor.

### METHODS

The survey was cross-sectional and sample size was estimated with an absolute precision of 5% and a 95% confidence level, and based on the prevalence of wasting and other nutritional indicators, and night blindness. The total sample size per district was 1,200 households with underfive children. Thus, the total sample included in this survey was 4,800 households. Cluster random sampling was applied based on the proportional-to-population-size (PPS) method. From each district, 30 clusters were selected with PPS. Within each cluster, 40 households with underfive children were selected through systematic random sampling. The inclusion criterion for the survey was households with at least one child under the age of five years. If a household had more than one child underfive years of age, all of them were included in the survey. Respondents were mothers or caregivers. Data were collected on the underfive child(ren), their mother, as well as the household.

Anthropometric measurements were taken and a pre-coded questionnaire was used to record the health and nutrition of mothers and all of her underfive children. Information was also collected on household demographics, socioeconomic status, food consumption, vitamin A intake and household food security through an interview conducted by trained data collectors. The analysis was carried out based on the UNICEF conceptual framework

<sup>a</sup> PULIH is an EC-funded project implemented by CARE targeted at integration of ex-IDP's in Timur Tengah Utara and Belu districts

for the causes of malnutrition.<sup>5</sup> Weighting was used to adjust for population size by district in order to obtain the overall figures that represent West Timor as a whole.

## FINDINGS

### Malnutrition among underfive children

Malnutrition, which is preventable and some of its forms treatable, is a major underlying cause of child mortality and morbidity. It is measured as low height-for-age (stunting), low weight-for-age (underweight), and low weight-for-height (wasting). Stunting, or chronic malnutrition, is the failure to reach one's biological potential for growth. Stunting is the result of extended periods of inadequate food intake, poor dietary quality, increased morbidity, or a combination of these factors. Wasting indicates significant recent or current weight loss, often resulting from severe disease or emergency conditions. Under conditions of marginally adequate food intake, its onset can occur rapidly, particularly during acute illness. A high prevalence of wasting often arises as a result of starvation or infectious diseases. Wasting often develops very rapidly but can be reversed quickly with an appropriate intervention.<sup>6</sup> Underweight can imply stunting and/or wasting because it reflects insufficient weight gain relative to age.

The classification for anthropometrical indices using the reference limits at two standard deviations (SD) above and below the median of new World Health Organization (WHO) Child Growth Standards were used as the reference growth curves for child height-for-age, weight-for-height, and weight-for-age.<sup>7</sup> The 2005 WHO reference was used and children with anthropometric indices <-3 SD and -3 SD to <-2 SD are classified as severe and moderately malnourished, respectively.<sup>8</sup>

Figure 1 shows that acute malnutrition (wasting) was very high at 13.1%. Wasting prevalence reached 15.3% in Belu, indicating a 'critical' emergency food insecurity situation.<sup>2</sup> The prevalence of severe wasting in Belu was also the highest compared to the other districts (2.8%). The prevalence of wasting in Kupang almost reached the criti-

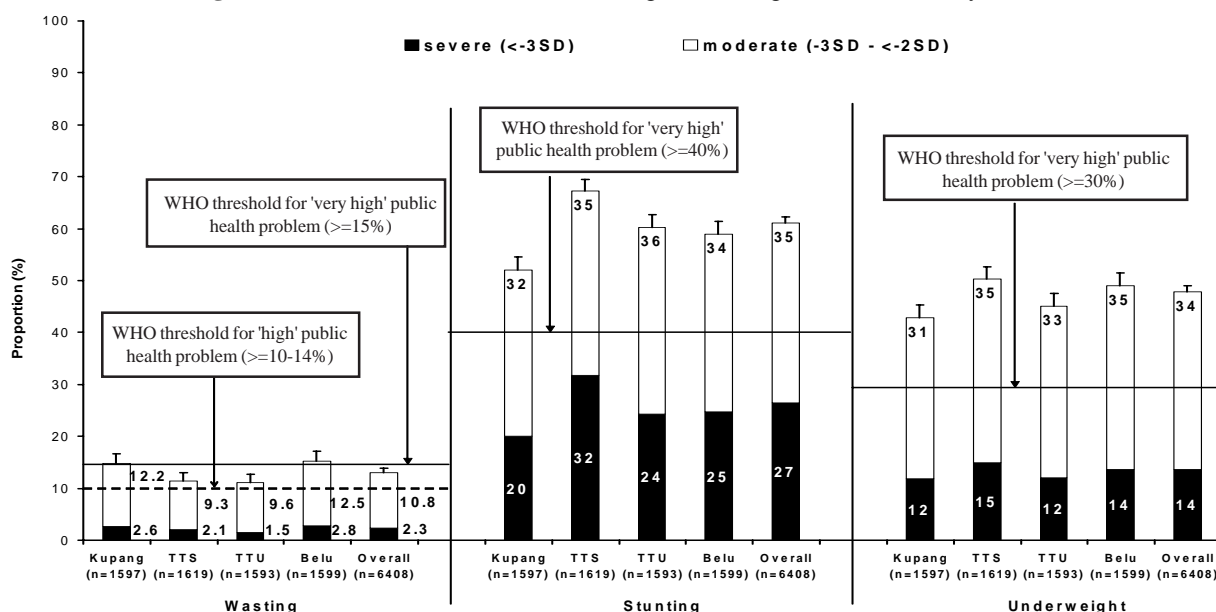
cal threshold at 14.8% and severe wasting at 2.6%. Wasting prevalence was highest among children aged 6-23 months (17.9%-18.5%; data not shown). Overall, the prevalence of chronic malnutrition (stunting) among children aged 0-59 months was 61.1%, ranging from 52.1% in Kupang to 67.1% in TTS. There was an increase after the first year of life, surpassing the WHO cut-off point for very high prevalence ( $\geq 40\%$ ) among children aged 12-59 months (data not shown). This finding indicates that the diet has been of very poor quality for a very long time. The prevalence of underweight among children aged 0-59 months was 47.8%, ranging from 42.8% in Kupang to 50.2% in TTS. Disaggregated data by age revealed that the prevalence of underweight after the first year of life exceeded the "very high" cut-off point ( $\geq 30\%$ ) and remained very high among older children (23-59 months) (data not shown).

### Anemia (Hb<11g/dL) among children

Anemia is defined as a lower than normal hemoglobin (Hb) concentration. Nutritional anemia occurs when there is an inadequate body store of a specific nutrient needed for Hb synthesis. The WHO estimates that about 42% of preschool children in developing countries suffer from anemia.<sup>9</sup> Inadequate absorption of dietary iron is the main explanation for the much higher prevalence of anemia in the developing countries of Asia and other regions. Iron deficiency anemia is the most widespread nutritional problem in Indonesia, affecting 40 percent of preschool children.<sup>10</sup> Iron deficiency anemia impairs the immune system and reduces physical and mental capacity among affected among infants and young children with a wide range of consequences on intellectual development and mortality.<sup>11</sup> In public health terms, WHO has classified an anemia prevalence of  $\geq 40\%$  as 'high'.<sup>1</sup>

Figure 2 shows that almost sixty percent (58.3%) of children aged 3-59 months suffered from anemia (Hb<11g/dL), and the prevalence is very high across districts (ranging from 51.0% in TTS to 64% in Kupang). Children aged 3-23 months are the most vulnerable where the prevalence of anemia was extremely high at around 80%. An alarmingly high prevalence of anemia among underfive chil-

**Figure 1.** Prevalence of malnutrition among children aged 0-59 months by district



dren suggests a low intake of micronutrient-rich foods, which is consistent with the very high prevalence of stunting (Figure 1).

#### Thinness (BMI<18.5kg/m<sup>2</sup>) among non-pregnant mothers

Although it is normal to find a relatively small proportion of thin individuals within a population, an excessive proportion may indicate the presence of food insecurity or widespread infectious diseases. Even when the food supply is adequate or environmental stress limited, excessive thinness points to the vulnerability of certain members of the population with marginal energy reserves in the event of drought, seasonal food shortages, or epidemics.<sup>12</sup> Undernourished mothers are often physically weak and are unable to optimally perform income-earning activities and household work, thus affecting their ability to care for their children.<sup>13</sup>

Mothers who are undernourished before and during pregnancy are more likely to give birth to underweight infants. Furthermore, malnutrition in mothers has also been linked to hearing problems, learning difficulties, *spina bifida* and brain damage in their children.<sup>14</sup>

The prevalence of thinness at 24% was high, according to WHO criteria, confirming the seriousness of the food insecurity situation. Belu district had the highest prevalence of maternal thinness at almost 30% (Figure 3).

#### Anemia (Hb<12g/dL) among non-pregnant mothers

Worldwide, almost half a billion women are anemic, largely due to inadequate quality and quantity of iron in the diet.<sup>15</sup> Compared with non-anemic mothers, unfavorable pregnancy outcomes have been reported to be more common in anemic mothers.<sup>16</sup> Women with severe anemia can experience difficulty meeting oxygen transport requirements near and at delivery, especially if significant hemorrhage occurs. This may be an underlying cause of maternal death and antenatal and prenatal infant loss<sup>17,18,19</sup> Infants born to anemic mothers frequently suffer from low birth weight, prematurity, and anemia.<sup>20</sup>

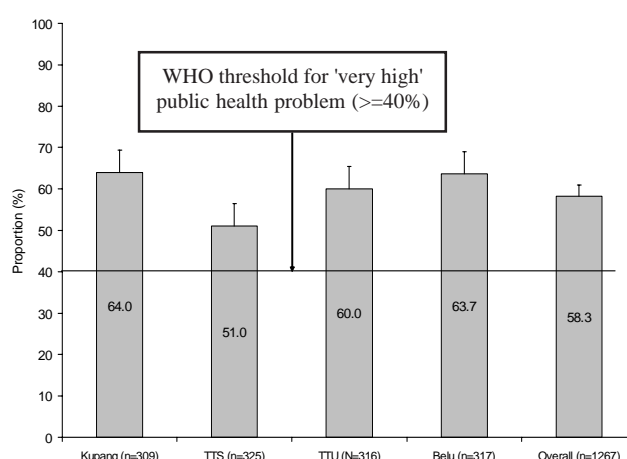
Figure 4 shows that the prevalence of anemia (Hb<12g/dL) among non-pregnant mothers was 35.8%, with the highest prevalence found in Kupang at 48.1%, which is categorized as very high according to WHO.<sup>1</sup>

#### Diarrhea and ARI among children

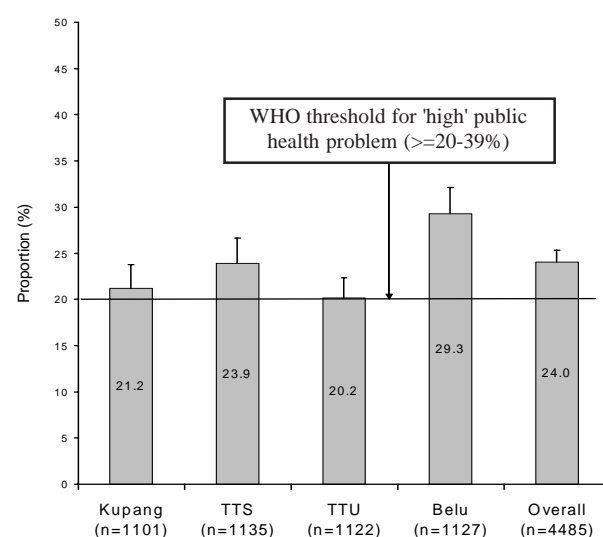
It has been widely accepted that certain infections have profound negative impacts on nutritional status, mediated by changes in dietary intake, absorption, nutritional requirements (especially for energy and protein) and loss of endogenous nutrients. Prospective studies of growth and morbidity in children have identified certain infections (acute respiratory infections (ARI) and diarrheal diseases) as particularly important causes of poor growth.<sup>21,22</sup> It is estimated that, in developing countries, malnutrition contributes to 35-50% of all deaths among children, most of which are due to infectious diseases.<sup>23,24</sup>

Figure 5 shows that diarrhea in the 7 days prior to the interview among children aged 0-59 months was quite prevalent, ranging from 3.4% in Kupang to 5.6% in TTS. Analysis by age group revealed that the prevalence of

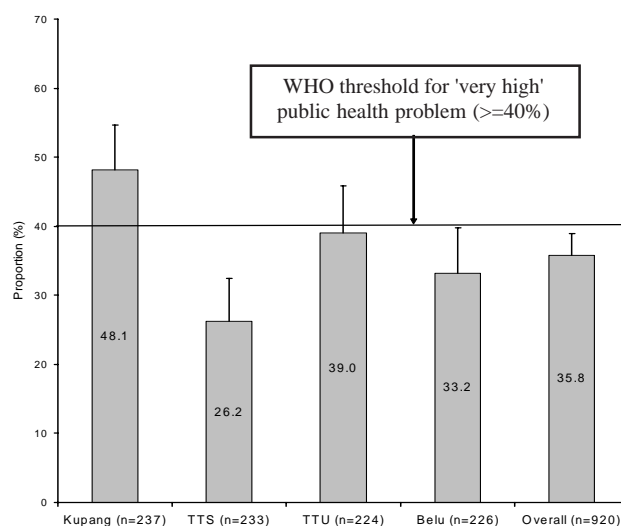
**Figure 2.** Prevalence of anemia (Hb<11 g/dL) among children aged 3-59 months old by district



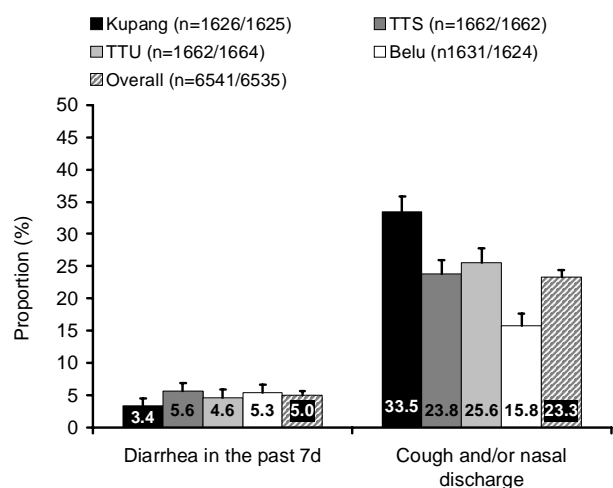
**Figure 3.** Prevalence of maternal thinness (BMI<18.5kg/m<sup>2</sup>) among non-pregnant mothers by district



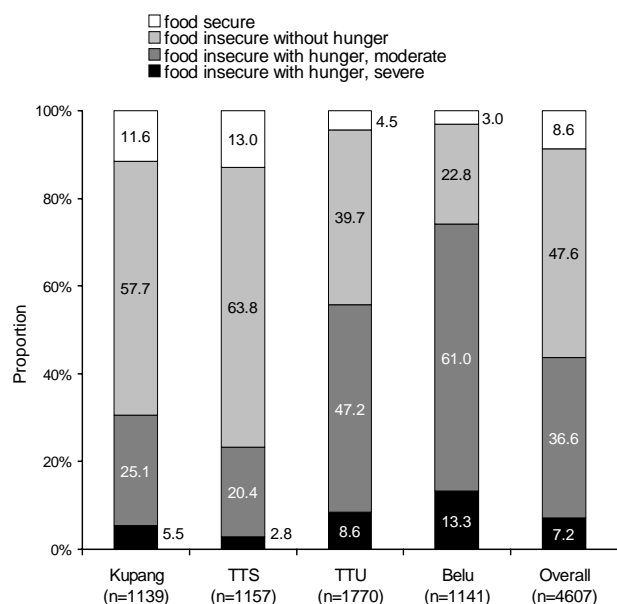
**Figure 4.** Prevalence of anemia (Hb<12g/dL) among non-pregnant mothers



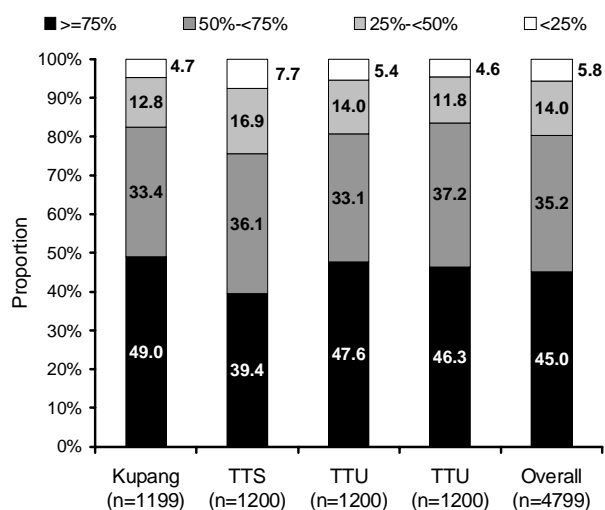
**Figure 5.** Prevalence of diarrhea and acute respiratory infection (ARI) symptoms among children aged 0-59mo by district



**Figure 6.** Household food security situation by district



**Figure 7.** Proportion of household expenditure spent on food



diarrhea among children aged <24 months was almost twice as high as that among older children (data were not shown). ARI was also very prevalent, ranging from 15.8% in Belu to 33.5% in Kupang. A high prevalence of diarrhea reflects poor sanitation and/or an unhygienic environment in the household and in the neighborhood. A high prevalence of ARI reflects poor hygiene and household crowding.

### Household food security

Food insecurity is an important underlying cause of malnutrition. A household that is food and nutrition secure has adequate access to food of sufficient quantity and quality, including energy, protein and micronutrients to ensure adequate intake and a healthy life for all members of the household. Through the systematic monitoring of food insecurity, the incidence and prevalence of this condition can be identified, and the characteristics of households and individuals who experience food insecurity can be defined. Furthermore, through monitoring the relationship between household-level problems of food insecurity and changing social and economic conditions, policies, and intervention programs can be understood. As such, monitoring food insecurity would lay a valuable foundation for the development of policies and programs to address this problem.<sup>25</sup>

The proportion of households with food insecurity (without or with hunger) was 91.4%. About 7% of the households experience food insecurity with hunger (severe). The highest prevalence of food insecurity with hunger (severe and moderate) was found in Belu at 13.3% and 61%, respectively (Figure 6).

### Household Food Expenditure

Rising food prices since the early 2000s affect the poor directly, as producers and consumers, and indirectly, through the impact on their economies. Since the poor tend to spend a higher proportion of their total expenditure on food, this proportion has been suggested as a measure of poverty. The greatest concern is that rising food prices have resulted in reduced food consumption among the poor. This may not mean as large a fall in calorie intake, as households may spend more on cheaper, calorie-rich staples and less on foods rich in protein and vitamins, such as meat, fish, dairy, fruits and vegetables, reducing the quality of their diet. In developing countries, food expenditure accounts for more than 50% of household income.<sup>26,27</sup>

Figure 7 shows that as much as 45% of households spent  $\geq 75\%$  of their income on food while more than 80% spent  $\geq 50\%$  of their income on food. Further analysis revealed that the proportion of income allocated for food and animal-source foods was 73% and 5%, respectively (data not shown). Thus, while the proportion of income spent on food was very high, only a very small proportion was spent on animal-source foods. This finding confirms that the households do not have adequate access to food, not only in terms of quantity but also quality.

### Exclusive breastfeeding

Exclusive breastfeeding for the first six months of a child's life, as recommended by the WHO, not only provides the best nourishment and protection from infection, it also

enables mothers and their infants to develop a close emotional bond. Infant and child feeding practices are major determinants of the risks of malnutrition. In keeping with the international recommendations of WHO and UNICEF, the Indonesian Ministry of Health recommends exclusive breastfeeding for the first six months of life, breastfeeding with complementary feeding starting at about six months of age, and continued breastfeeding in the second year of life and beyond.<sup>12</sup>

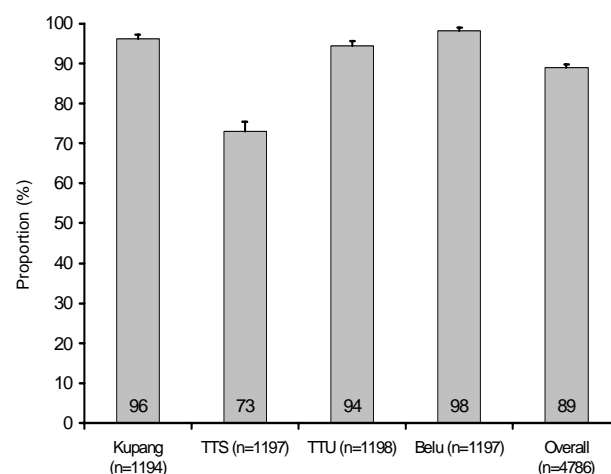
Figure 8 shows breastfeeding practices among children aged 0-5 months. The survey revealed that <50% of the infants under the age of 6 months at the time of interview were exclusively breastfed (48.2%, data not shown). Analysis by age group revealed that the proportion of infants who were exclusively breastfed declined considerably with age and only 30.5% of children were still exclusively breastfed at age 4-5 months. This pattern is similar across districts.

### Maternal education

The link between maternal education and child nutritional status has been explained through socio-economic status, and women's empowerment. Accordingly, maternal education is associated with the level of child care provided. Observational studies of mother-child interactions of educated and uneducated women have revealed patterns of behavior that reflect a more committed attitude toward child care among educated women. It is predominantly because an educated woman is more knowledgeable and capable of using health care facilities, keeping her environment cleaner, which benefit her children.<sup>28</sup> Some studies have found strong, positive links between maternal education level and child nutrition.<sup>29</sup>

This survey found that most of the mothers had some primary education (55.8%). However, the proportion of mothers who never attended school was quite high at 10.2%, in particular in Belu (17.1%) and TTU (11.6%) (data not shown)

**Figure 9.** Proportion of underfive children who attended Posyandu in the past month by district

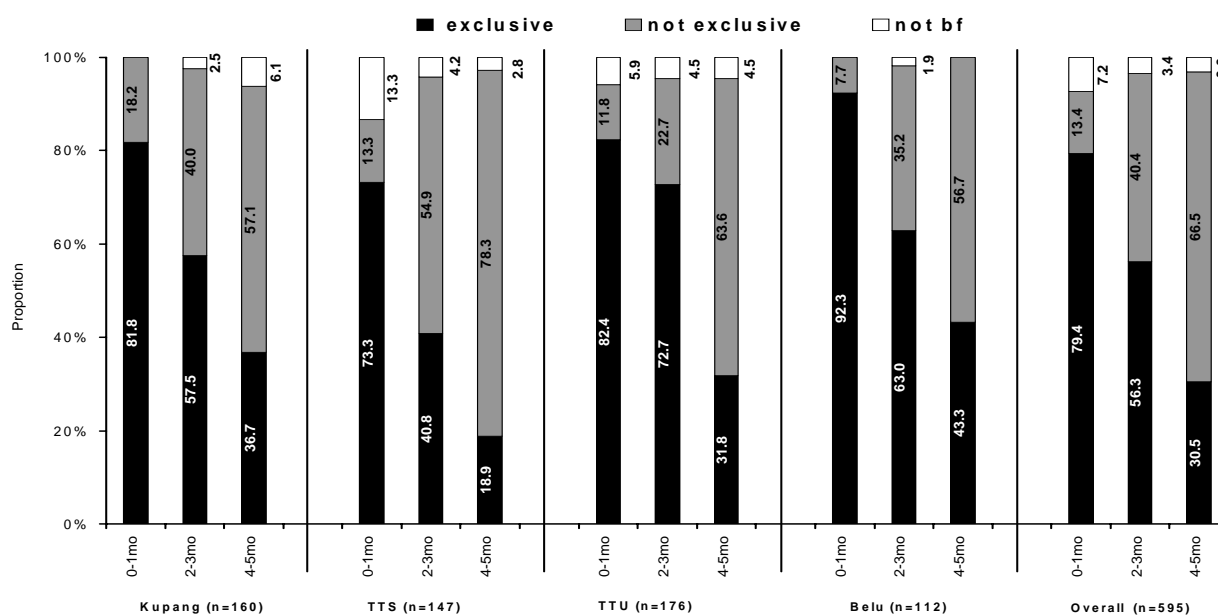


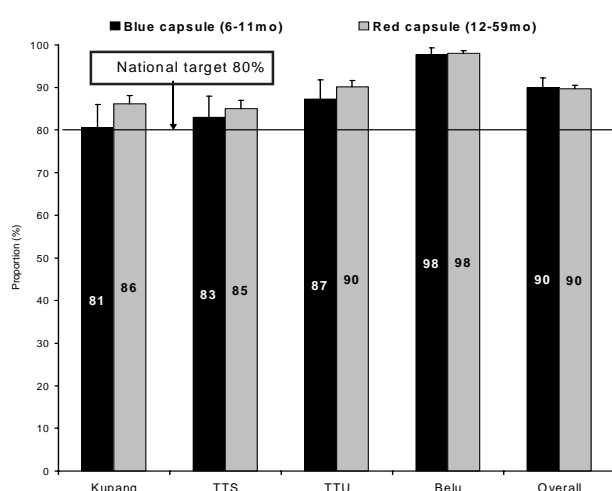
### Posyandu coverage

The *Posyandu* is a community-sponsored sub-village health service post. It functions as a center providing monthly integrated services of health and nutrition, especially for expecting mothers and children aged 0-5 years. The *Posyandu's* most important programs are the (1) Expanded Immunization Program, which provides immunizations; (2) Diarrhea Control Program, of which the purpose is to abate diarrhea by providing oral re-hydration therapy, and (3) Intervention Program, including child growth monitoring, nutrition education, and the distribution of VA capsules, and iron tablets for children and mothers. Mothers take their children to the center to receive these services from the health personnel with the help of trained cadres or volunteers.<sup>30</sup> *Posyandu* utilization can be used as an indicator of community access to health service and the performance of health service providers.

Figure 9 shows that, overall, 89% of under-five children attended *Posyandu* within one month prior to the survey; this proportion was lowest in TTS.

**Figure 8.** Breastfeeding practices of infants at the time of the interview by age



**Figure 10.** Vitamin A capsule coverage for August 2007 by district

### Vitamin A capsule coverage

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage for vitamin A capsules (VAC) among children 6-59 months of age.<sup>31</sup> Indonesia's current policy is that, twice a year, infants between 6-11 months of age should receive vitamin A supplementation at a dosage of 100,000 IU and children between 12-59 months should receive 200,000 IU. Mass campaigns for the distribution of VACs are held every February and August.<sup>32</sup> In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.<sup>33</sup> Data from the GOI/HKI Nutrition and Health Surveillance System (NSS) show that malnutrition and morbidity are higher in children who are missed by periodic vitamin A capsule distribu-

tion<sup>34</sup>, thus coverage needs to be close to 100%, especially in places such as West Timor.

VAC coverage for both age groups across the districts meets the national target of 80% (Figure 10). The high coverage may be due to the ongoing promotion of the supplementation months, which is essential to maintain public awareness about the program. The high coverage of VAC distribution is concurrent with high *Posyandu* attendance (Figure 9). The main source for VAC is the *Posyandu* (74%). Other sources are health centers and home visits by health workers (data not shown).

### Source of household drinking water

Access to clean drinking water was recognized as a human right by the United Nations Committee on Economic, Social and Cultural Rights in 2002.<sup>35</sup> A safe domestic water supply is a fundamental requirement for good health. Children bear the greatest burden of unsanitary water supply because of their susceptibility to diarrheal diseases and other water-borne and water-related infections.<sup>36</sup> Eighty eight percent (88%) of diarrheal disease has been attributed to unsafe water supply and inadequate sanitation and hygiene.

The overall proportions of households with access to a protected well and tap water (assumed to be a safe drinking water source)<sup>37</sup> were 31% and 10.4%, respectively, while 35.5% used an unprotected spring (unsafe water source) as their household's source of drinking water (data not shown). Some households also used water from unprotected wells (14%), ponds/rivers (10.5%) and other sources (2.8%). TTS and Belu had the lowest proportion of the households with access to safe water (-35%), compared to Kupang (-51%) and TTU (-49%).

## CONCLUSIONS

- There is a high prevalence of acute malnutrition (13.1%), very high prevalence of stunting (61.1%), and underweight (47.8%), as well as alarmingly high anemia rates (58.3%) among underfive children.
- There is a high prevalence of thinness (24%) and anemia (35.8%) among non-pregnant women.
- There is a high prevalence of infectious diseases, as indicated by the high prevalence of diarrhea, particularly among younger children (7.3% among children 6-23 months of age), and the high prevalence of ARI (23.3%).
- There is a high proportion (91.4%) of households experiencing food insecurity, with about 7% of all households suffering from severe hunger.
- There is a very high proportion of income spent on food (73%) and very low proportion of income spent on animal-source foods (5%). An increase in food prices without a proportional income increase will probably lead to further deterioration of the nutritional status and increase of micronutrient deficiencies among children and mothers.
- There is a low proportion of exclusive breastfeeding of children aged <6 months (48.2%)
- There is high *Posyandu* attendance and there was a high coverage of vitamin A capsule distribution in August 2007.
- The survey offered added value in the form of capacity building to local human resources, including government staff; it serves as the basis for decision making and program planning; and the results confirmed the urgent need for nutrition surveillance revitalization.

## RECOMMENDATIONS

- The unacceptably high prevalence of acute malnutrition (which will be further aggravated by rising food prices) needs prompt and adequate intervention based on best practices and evidence. Program interventions need to be established and/or scaled up, and focused on existing gaps in the GOI capacity to reduce humanitarian suffering and the irreversible impact of moderate and severe wasting among underfive children.
- The use of Ready-to-Use Therapeutic Food (RUTF) as an integral part of severe malnutrition case management needs to be expanded and strengthened with strong endorsement from the government.

- Interventions should be developed to lower the rates of anemia among children younger than five years of age. The extremely high level of anemia among underfive children is alarming and requires immediate attention as it may herald a 'lost generation' because of the long lasting and possibly irreversible negative impact on cognitive development.
- Nutrition programs should address household food security by increasing household access to food (i.e., home-stead food production, targeted food assistance, multi-micronutrient supplementation, income generating activities, food/cash for work initiatives focusing on rapid asset enhancement, small scale irrigation, improved drainage system).
- More efforts to promote and support exclusive breastfeeding are needed (i.e. training of health care personnel on importance and ways to facilitate successful exclusive breastfeeding).
- Environmental sanitation programs, including provision of safe drinking water, should be stepped up.
- Community participation should be revitalized/strengthened along with the GOI surveillance to enable an early warning system on health, nutrition, and food security.

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