

CRISIS BULLETIN

– I N D O N E S I A I N T R A N S I T I O N –

**Nutrition and Health Surveillance in
rural Banten**

Key results for the period: Jun 2001 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for Banten are that - *anemia rates in children aged 12-23 months are higher than in other rural areas, reaching up to 75%. Exclusive breastfeeding among infants 0-5 mo of age was higher than in other areas, but still no more than one-half of infants 0-1 mo of age was exclusively breastfed. In Jun-Sep 03, less than 40% of children had received all standard childhood immunizations. Child anthropometry is also worse than in many other rural areas with stunting in the WHO category of "very high" (although a decline over time was seen) and wasting in the WHO designated "critical emergency" category.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current

activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Fig 1. Anemia among children 12-23 months of age

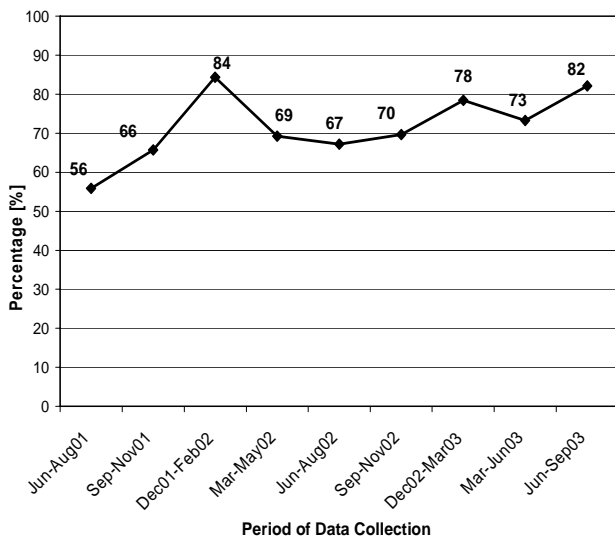
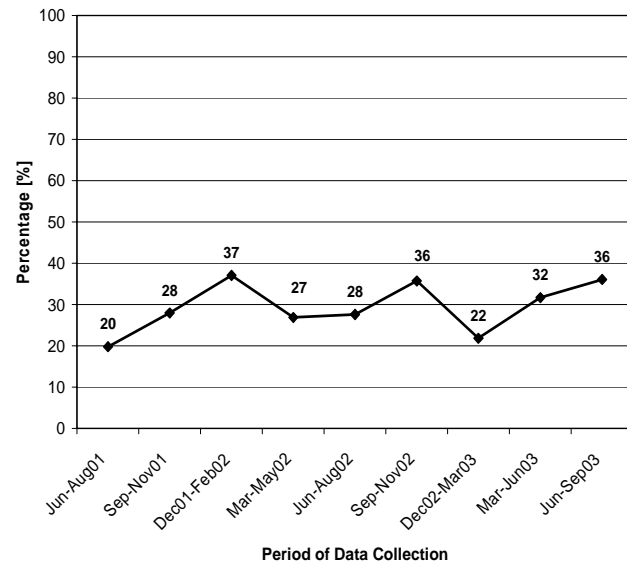


Fig 2. Anemia among non-pregnant mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country’s total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children’s Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.¹

Data presented in this Bulletin highlight the health and nutrition situation in Banten Province.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

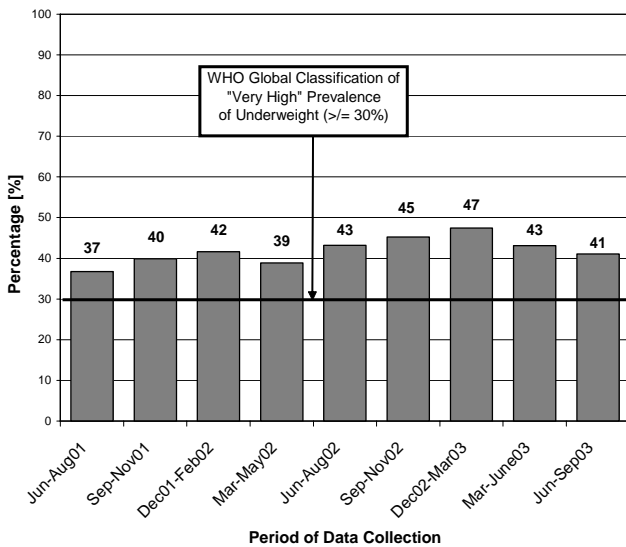
Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.²

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.³

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: General - Levels of anemia were universally high in rural provinces and showed few

Fig 3. Prevalence of underweight children 12-23 months of age



signs of improvement. *Banten* - The prevalence of anemia in Banten was worse than the rural trend and varied between 56-84% from Jun 01-Sep 03.

Anemia among Non-Pregnant Mothers

(SEE FIG. 2)

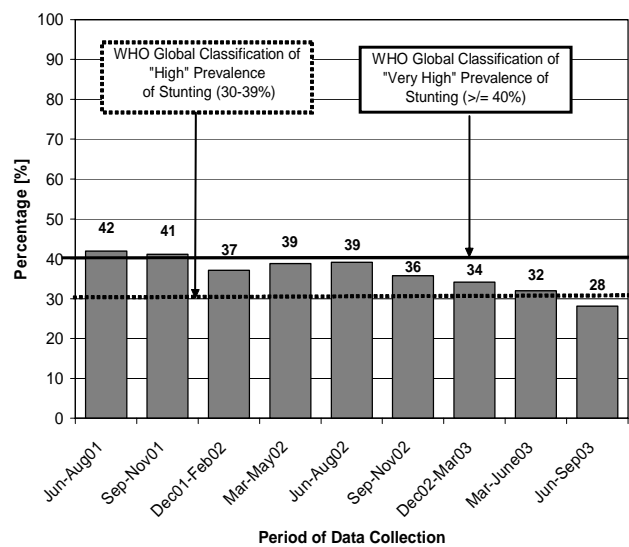
Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.²

Importance: Iron deficiency in non-pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: General - Anemia levels in rural areas ranged between 23-27% and did not change over

Fig 4. Prevalence of stunted children 12-23 months of age



time. *Banten* - The prevalence of anemia among non-pregnant women fluctuated between 20-37%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

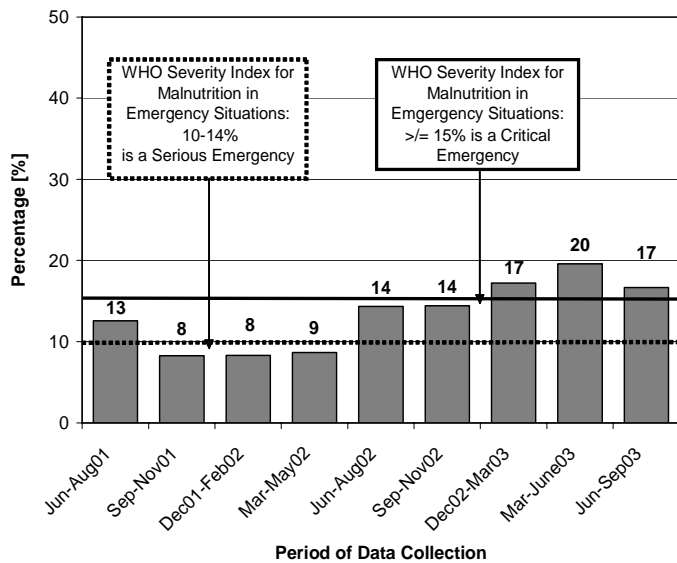
Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq 30\%$ as “very high” for children under 5 years.⁴

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: General - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a “very high” prevalence for 12-59 month old children. *Banten* - The underweight prevalence was 37% in the first round of data collection from Jun-Aug 01, and was 41%

Fig 5. Prevalence of wasted children 12-23 months of age



in the last round of data collection from Jun-Sep 03. Prevalence of underweight reached its height in the Dec 02 - Mar 03 period of data collection at 47%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

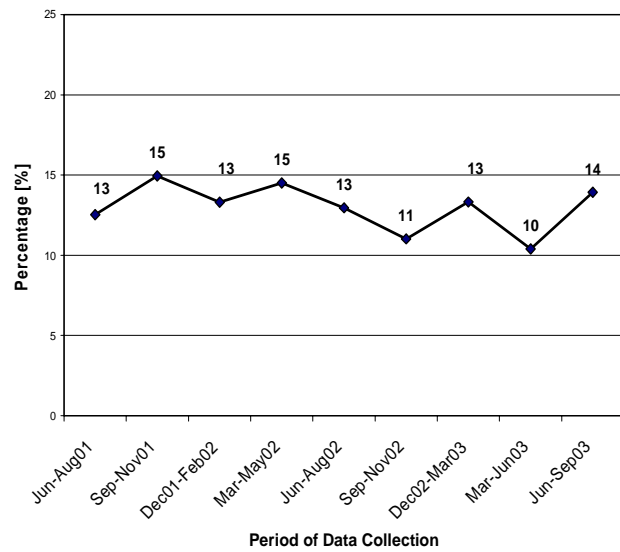
Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years $\geq 40\%$ as “very high” and levels $\geq 30-39\%$ as “high”.⁴

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children⁵, related to lower cognitive ability⁶, and increased risk of obesity as an adult.⁷

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: General - Most rural provinces had levels of stunting among children 12-23 months of age classified as “high” by WHO standards for children 12-59 months for all rounds, and in general

Fig 6. Percentage of non-pregnant mothers with low body mass index



these levels did not decline. *Banten* - In contrast to other rural provinces, stunting declined. The prevalence of stunting was 42% in the Jun-Aug 01 period of data collection, and was therefore classified as a “very high” prevalence by the WHO. Subsequently, the prevalence declined 12 percentage points to 28% by the last round of data collection from Jun-Sep 03, placing it just below the cutoff for “high” prevalence as determined by the WHO.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

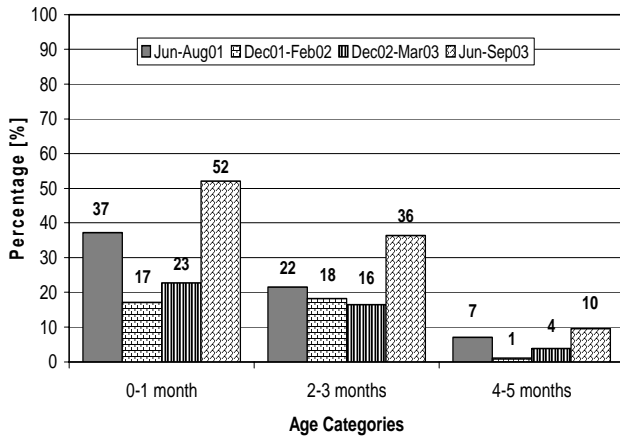
Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years $\geq 15\%$ as a “critical emergency situation” and levels $\geq 10-15\%$ as a “serious emergency situation”.⁴

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.⁸

Data Collection Method: Children were classified as wasted if their weight for height was less than -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: General - Wasting among rural Indonesia children 12-23 months of age varied between 9-

Fig 7. Prevalence of exclusive breastfeeding among children 0-6 months of age



13%. *Banten* - Wasting increased in later rounds of data collection. The level of wasting was 13% in the first round of data collection from Jun-Aug 01. The prevalence declined in subsequent rounds, but beginning in the Jun-Aug 02 round an alarming rise in the prevalence of wasting was observed. The prevalence of wasting reached 17% in the last round of data collection from Jun-Sep 03. This is well above the WHO classification of a “critical emergency” situation for children 12-59 months of age.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

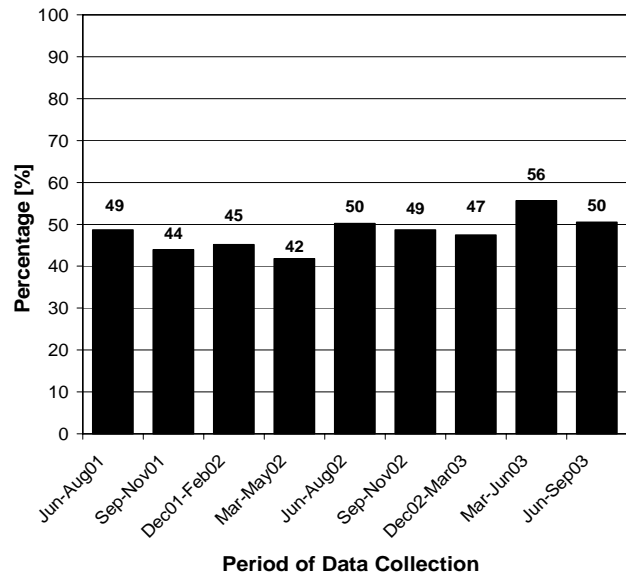
The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m². BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: General - Maternal thinness appeared to decline slightly in rural provinces. The most

Fig 8. Household use of adequately iodized salt



notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *Banten* - Maternal thinness followed the rural trend with small fluctuations over time.

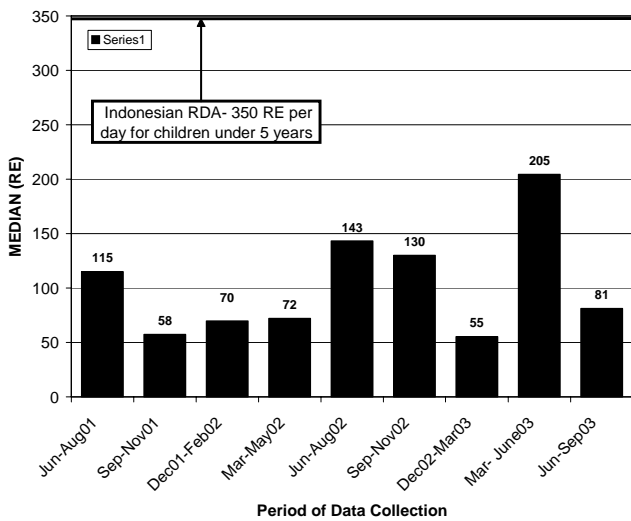
Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant’s life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months. Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: General - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *Banten* - In contrast to

Fig 9. Vitamin A intake of children 12-59 months of age



other rural provinces, in Banten, exclusive breastfeeding declined between Jun-Aug 01 and Dec 01 – Feb 02, but then was much higher again in Jun-Sep 03. At the last round, 52% of infants 0-1 mo old and 36% of infants aged 2-3 mo old were exclusively breastfed. However, there is considerable variation around these numbers, because the number of children of this age about whom data were collected, particularly in Banten, was low. Among children aged 4-5 mo old, the proportion that was exclusively breastfed was very low, both in the beginning and end of data collection (varying between 1-10%).

Household Use of Adequately Iodized Salt

(SEE FIG. 8)

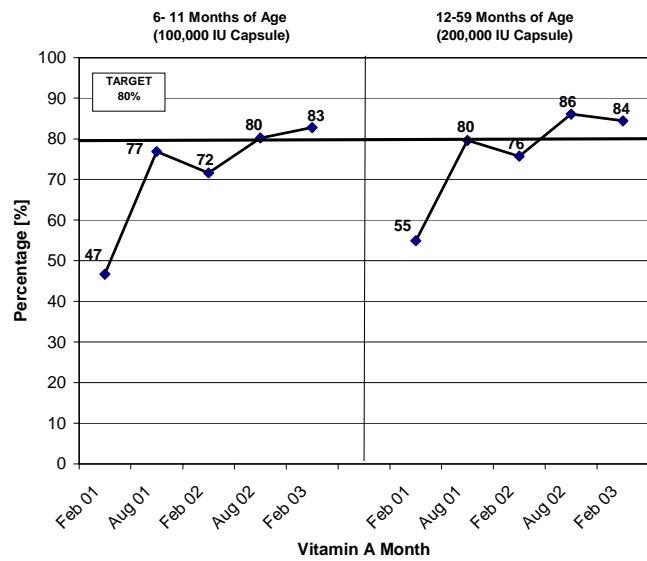
Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.⁹

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas,

Fig 10. Vitamin A capsule coverage among children 6-59 months of age



reaching 60-70% during the last rounds. *Banten* - The use of adequately iodized salt increased slightly, but at ~50% is still very low compared to other rural provinces.

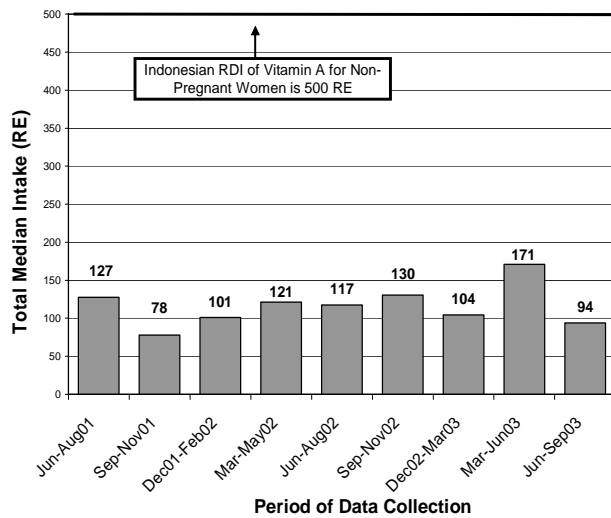
Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.¹⁰ However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-sings of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International¹¹ was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers



Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: General - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. **Banten** - Vitamin A intake was also well below the requirements.

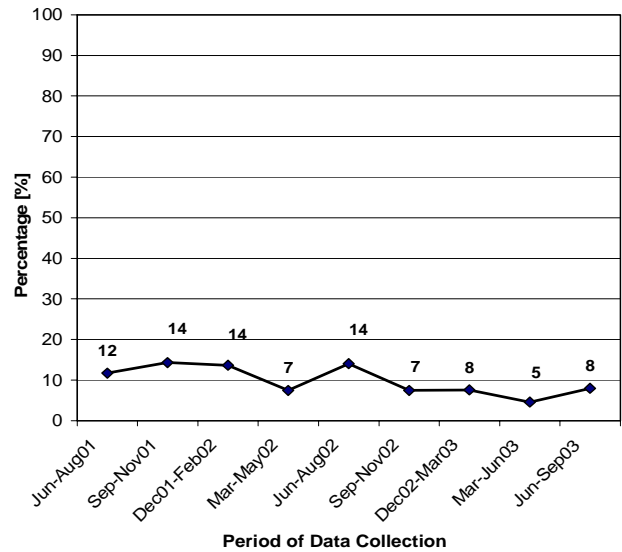
Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.¹² All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xerophthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.¹⁰ Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.¹³

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of

Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



the child at the start of the campaign month was determined based on the child's birth date.

Findings: General - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. **Banten** - The percentage of children who received vitamin A capsules increased in both age categories and reached the target of 80% in the last two distribution months (August 2002 and February 2003).

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months*). However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.¹⁴ Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Fig 13. Complete immunization status of children 12- 17 months of age

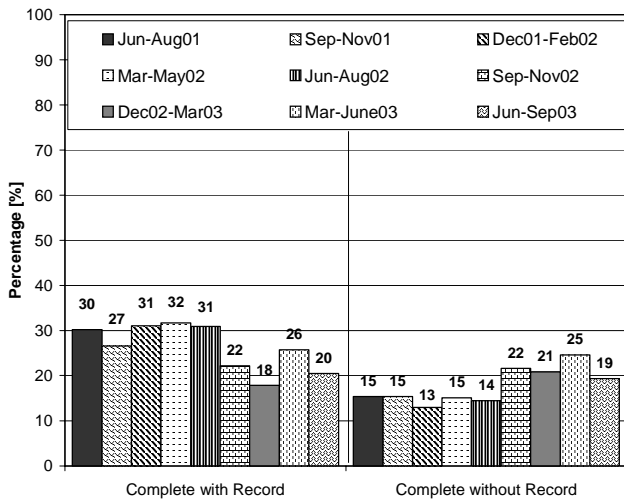
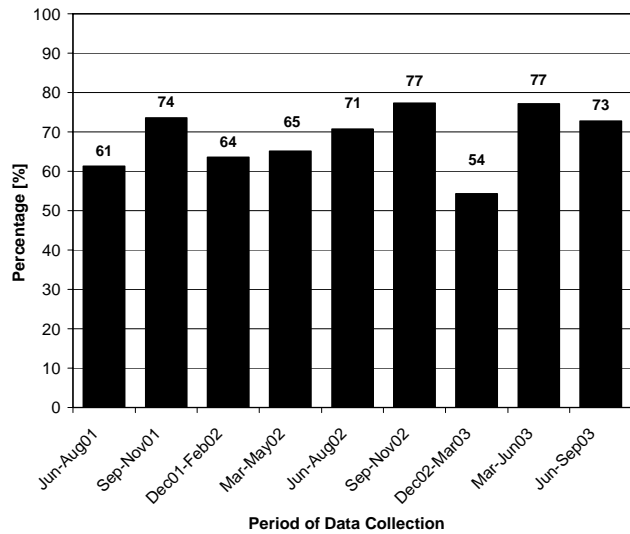


Fig 14. Posyandu attendance in the previous month



Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: General - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *Banten* – Banten was no exception to the general trend with an intake below approximately one-quarter of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia’s official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant’s nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

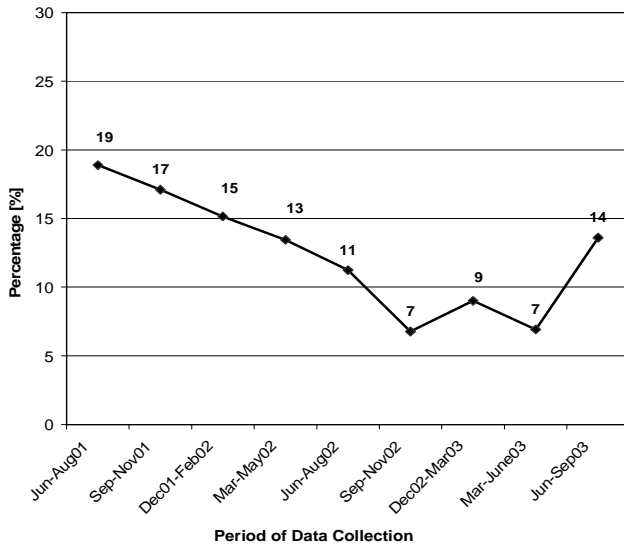
Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: General - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *Banten* - Post partum VA supplementation coverage was lower than other rural provinces (~10%).

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days



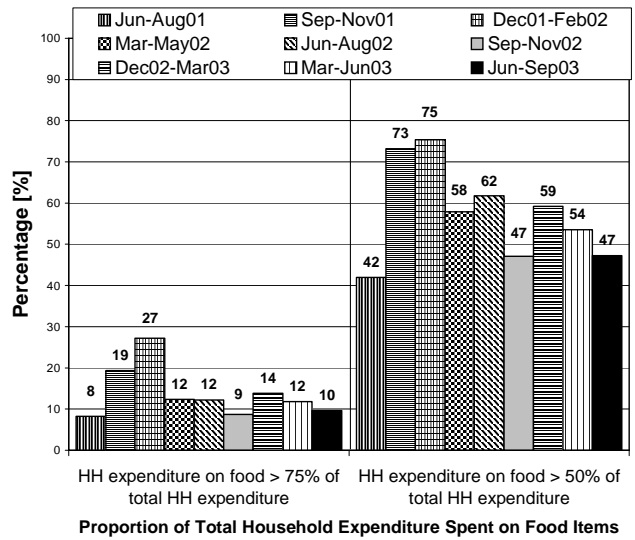
immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *Banten* - Completed immunization was very low. Completed immunization with an official record varied between 18-32%, and without record

Fig 16. Household Expenditures on Food Items



between 13-25%. By Jun-Sep 03, more than half (61%) of the children aged 12-17 mo in Banten had not received all standard childhood vaccinations.

Posyandu Attendance in the Previous Month
(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu* records. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General - Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *Banten - Household Posyandu* attendance increased slightly over time, indicating a sustainable and active health system. Attendance in the last round of data collection from Jun-Sep 03 was 73%. Nevertheless, attendance did fall off at times, as most strongly observed during Dec 02 - Mar 03.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.¹⁵

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General - Overall*, diarrhea among children in rural areas declined from 12% to 6%. *Banten - Diarrhea* among children declined rapidly in the last 2 years, from 19% to 7%. However, in the last round of data collection, from Jun-Sep 03, prevalence of diarrhea rose from 7% to 14%.

Household Expenditures on Food Items

(SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.¹⁶

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more than 50% and 75% of their total expenditures on food was calculated.

Findings: *General - The* proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *Banten - The* percentage of families spending more than 75% of their total income on food was highest in Dec 01 - Feb 02 (27%) and declined to 10% in Jun-Sep 03. A similar trend was observed for households spending >50% on food. Proportions were lower than in rural areas overall.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately

50%. *Banten* - Anemia rates in children aged 12-23 months are higher than in other rural areas, reaching up to 75%. Exclusive breastfeeding among infants 0-5 mo of age was higher than in other areas, but still no more than one-half of infants 0-1 mo of age was exclusively breastfed. In Jun-Sep 03, less than 40% of children had received all standard childhood immunizations. Child anthropometry is also worse than in many other rural areas with stunting in the WHO category of "very high" (although a decline over time was seen) and wasting in the WHO designated "critical emergency" category.

References:

1. Helen Keller International/Indonesia (2000). *Nutrition Surveillance: How does it work?*. HKI Technical Programs Series. Indonesia Crisis Bulletin. Year 2, Issue 2, Jakarta: Helen Keller Worldwide.
2. Hercberg, Serge (1991). *Iron and Folate Deficiency Anemia*. In: F. Falkner and M. Hall (eds). *International Child Health: A Digest of Current Information Vol 2 (2)*. International Pediatric Association/ WHO/ UNICEF.
3. Hawson C, Kennedy E, Horwitz A eds (1998). *Prevention of Micronutrient Deficiencies: Tools for Policy Makers and Public Health Workers*. Washington DC: National Academy Press.
4. WHO (1995). *Physical Status: The Use of and Interpretation of Anthropometry*. Report of a WHO Expert Committee. Technical Report Series 854, Geneva.
5. Katz, J., K West, I Tarwotjo, A Sommer (1989). *The Importance of Age in Evaluating Anthropometric Indices for Predicting Mortality*. *Am J Epidemiol* ;130 (6): 1219-1226.
6. Teasdale TW, Owen DR, Sorensen TIA (1991). *Intelligence and Educational Level in Adult Males at the Extremes of Stature*. *Human Biology*, 63; 1:19-30.
7. Hoffman et al (2000). *Why are Nutritionally Stunted Children at Increased Risk for Obesity? Studies of Metabolic Rate and Fat Oxidation in Shantytown Children from Sao Paulo, Brazil*. *Am J of Clin Nutr*; 72, 702-707.
8. Fawzi WW et al (1997). *A prospective Study of Malnutrition in relation to Child Mortality in the Sudan*. *Am J Clin Nutr* ; 65, 062-1069
9. Hetsel BS (1989). *The Story of Iodine Deficiency: An International Challenge in Nutrition*. Oxford:Oxford University Press.
10. Sommer A, Tarwotjo I, Djunaedi E et al (1986). *Impact of Vitamin A Supplementation on Childhood Mortality: A Randomized Controlled Community Trial*. *Lancet* 1: 1169-1173.
11. De Pee S, Halati S, Bloem MW, Soekarjo D, Sari M, Martini E, Kiess L. *24 VASQ Method for Estimating Vitamin A Intake : Reproducibility and Relationship with Vitamin A Status*. Report of the XIX International Vitamin A Consultative Group Meeting, p. 96. Washington, DC: IVACG, 1999.
12. Helen Keller International/Indonesia (2003). *Vitamin A Capsule Coverage Improves between the August 1999 and February 2002 Vitamin A Distribution Months*. HKI Technical Programs Series. Indonesia Crisis Bulletin. Year 5, Issue 1, Jakarta: Helen Keller Worldwide.
13. Beaton, G et al (1993). *Effectiveness of Vitamin A Supplementation in the Control of Young Child Morbidity and Mortality in Developing Countries*. Geneva: United Nations. (ACC/SCN State of the Art Series Nutrition Policy Discussion Paper No. 13).
14. Christian P et al (2001). *Maternal Night Blindness Increases Risk of Mortality in the First 6 Months of Life among Infants in Nepal*. *Journal of Nutrition*, 131:1520-1512
15. Esrey SA et al (1999). *Effects of Improved Water Supply and Sanitation on Ascariasis, Diarrhoea, Dracunculiasis, Hookworm Infection, Schistosomiasis, and Trachoma*. *Bulletin of The World Health Organization*, 69 (5): 609-621.
16. David, IP (2001). *Poverty and Statistic: Issues and recommendations for Improving Poverty Statistic*. Paper prepared for the Economic and Social Commission for the Asia Pacific. Twelfth Session: 27-30 November, Bangkok



FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
Senior Vice President, Chief Medical
Officer, Regional Director, Asia Pacific,
Helen Keller International
E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
Regional Coordinator
E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
Regional Scientific Advisor
E-mail: sdepee@compuserve.com
- Federico Graciano
Communications Officer
E-mail: graciano@singnet.com.sg

- John Palmer
Country Director, Indonesia
E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H., Ph.D.
Nutrition & Health Surveillance System
Program Director
E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
Field Operation and Data Management
Director, Indonesia
E-mail: emartini@hki-indonesia.org
- Roy Tjong M.D.
Deputy Country Director
E-mail: rtjong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

For general enquiries:

Federico Graciano
E-mail: graciano@singnet.com.sg

© 2004 Helen Keller International

Reprints or reproductions of portions or all of this document are encouraged provided due Acknowledgement is given to the publication and publisher

Projects carried out by HKI-Indonesia in collaboration with the above organizations are funded by the United States Agency for International Development (USAID).

This publication was made possible through support by the Office of Population, Health and Nutrition, USAID/Indonesia Mission, under the terms of Award No. 497-A-00-99-00033-00. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of the US Agency for International Development.