



Sumatra Healthy Schools Program (SHSP) in Indonesia

Baseline Assessment Results

Executive Summary

Mercy Corps is implementing a school-based program in Sumatra to promote healthy diets, health and hygiene of school and madrasa children and encouraging the replication of project successes in other school programs in Indonesia. An integral part of this project is distributing fortified soy milk and deworming pills and changing eating and hygiene behaviors of 170,000 students and teachers in elementary schools and madrasas in Sumatra, and implementing complementary water, sanitation and hygiene-related activities at the target schools.

In June through August of 2005, Mercy Corps conducted a baseline survey of its target population within four provinces of Sumatra (West Sumatra, Riau, Bengkulu, and Lampung). The purpose of the baseline survey was to collect information and data from the target population in order to measure their health status over time, assess how project interventions impact the health of the target population and inform Mercy Corps' project implementation and future interventions.

Major findings include:

- Anemia levels ranging from 40-56 % in the target provinces, all of which can be categorized as "high" per the WHO prevalence categories
- Worm infection rates ranging from 20-48 % in the four provinces
- Stunting levels ranging from 30-44 % in the target provinces

Rationale

Mercy Corps' baseline survey focused on three priority health indicators: anemia, parasite infection, specifically soil-transmitted helminthes (worms), and nutritional status using anthropometric measurements. These three groups of indicators were chosen because malnutrition and parasite infection can adversely affect the physical and mental development and health of children thus impairing students' ability to learn and grow at healthy rates. While worm infection is not an indicator of growth, it is a significant contributor to anemia therefore it was measured in order to better understand the causes of anemia beyond poor dietary habits.

According to the Indonesian PROFILES¹, a 2003 assessment of the affects of under nutrition in Indonesia, stunting leads to lower cognitive test scores, delayed enrollment, higher absenteeism and increased repetition of classes. Anemia affects cognitive development, attention span and memory and costs 5-10 IQ points per child (an estimated 40-80 million IQ points for the country) and is estimated to cost Rp 61,62 trillion in lost productivity over a 7-year period.

Baseline Data Collection and Analysis Methods

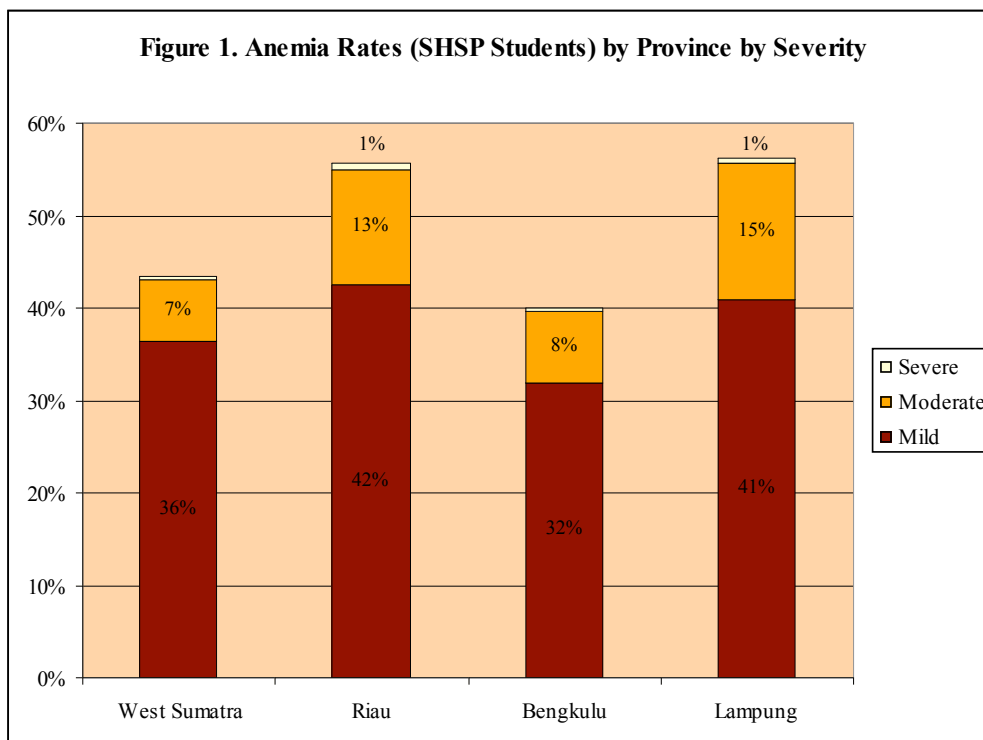
A total of 2,725 SHSP students plus 897 students from the control group participated in Mercy Corps' baseline for a grand total of 3,622 students surveyed in the four provinces. The focus of this document is on the SHSP population rather than comparing findings between the SHSP population and the control group. Mercy Corps will do a comparison of findings between the SHSP and control groups during its midline and endline assessments. Mercy Corps conducted its assessment in 10 districts/*kabupaten* (five urban and five rural) in the four provinces, sampling similar numbers of students from urban areas and rural areas in each province. Although Mercy Corps' SHSP program serves students ranging in age from six to 12 years old, Mercy Corps surveyed only students ages 6-7 years old with the assumption that these children would still be attending the same school during the

¹ Indonesia PROFILES Team Nutrition for Human and Economic Development in Indonesia

end line assessment². Mercy Corps tested students who received parental consent and volunteered to participate in any of the three tests that were offered. Not all volunteer students were assessed for all three tests (i.e. anemia, height and weight measurements and parasite infection (worms)).

Anemia

Mercy Corps worked with the local Departments of Health to measure 2,671 SHSP students’ blood hemoglobin level to detect anemia using the HemoCue³. Children with hemoglobin levels of less than 11.5 g/dl were classified as anemic per the WHO standard for children of this age (6-7 years). To understand the importance of the issue of anemia within a given population, WHO created prevalence categories: 15% or lower is considered low, 15- 40% is considered medium and above 40% is considered high.



Anemia rates were highest in Lampung Province (56%), followed by Riau Province (55%) and then West Sumatra (43%). Detected anemia levels were the lowest in Bengkulu Province at 40%. A total of 48% of SHSP students tested for anemia were anemic and 38% of the 48% were mildly anemic as per the WHO anemia classification system⁴. Ten percent of the tested SHSP students were moderately anemic and less than 1 % of the tested SHSP students were severely anemic. A total of 33% of SHSP children with anemia also had worms in the four provinces, thereby increasing blood loss and the likelihood of chronic disease or infection for

² Mercy Corps took volunteers from classes one and two to participate in its survey. Mercy Corps used two different statistic programs to obtain its sample size: 1) PEPI, Version 4.0 – PM Gahlinger & HJ Abramson, 1993 – 2001 and 2) STATS, Version 1.1 – Decision Analyst, Inc., both of which provided a sample size of 1,938. Mercy Corps established a maximum acceptable error measurement of + or – 2% and had a 95% confidence level for the accurateness of its data.

Mercy Corps used Epi Info for Windows (Version 1) to analyze the anthropometric data using NCHS/WHO as the reference population. Mercy Corps entered and analyzed the anemia and worm data by using MS Access XP for Database.

³ Hemoglobin photometer manufacturer.

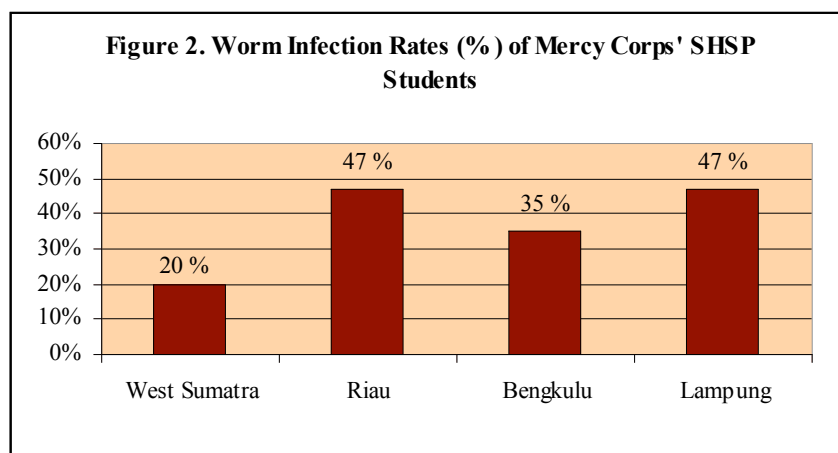
⁴ According to WHO, children between the ages of 5-11 years old are anemic if they have hemoglobin levels less than 11.5 g/dl. They categorize children of this age group as mildly anemic if their hemoglobin levels range between 10-11.4 g/dl, moderately anemic if their hemoglobin levels range between 7.0-9.9 g/dl and severely anemic if their hemoglobin levels fall below 7.0 g/dl (WHO/UNICEF/UNU (2001)).

these students. The percentage of SHSP children with anemia who also had worms was higher in Lampung Province (41%) and in Riau Province (38%).

Average anemia rates in the surveyed SHSP population in all four provinces range from 40-56%, thereby categorizing anemia levels as “high” per WHO’s criteria in all surveyed locations. Yayasan (Foundation) Kusuma Buana conducted an anemia baseline survey of elementary school children in Jakarta, Indonesia, in 2000-2001 and found anemia rates ranging from 35-49.5%, which is lower than the range of anemia Mercy Corps detected in its SHSP population. As of 1997, iron deficiency anemia affected approximately 25-35 % of Indonesia’s total population of 200 million people (Helen Keller International, 1997).

Parasite Infection

Mercy Corps and representatives from the local Departments of Health tested 2,318 SHSP students for intestinal worms by asking students to provide a stool sample in a plastic and sealed stool container provided by Mercy Corps. Representatives from the local Department of Health inspected the wet mount of the stool sample with a microscope to identify any eggs. After the result, Mercy Corps distributed deworming pills to the surveyed SHSP students.⁵



As shown in the chart above, Mercy Corps found the highest level of worm infection in Riau Province (48%) followed closely by Lampung Province (47%) for SHSP students. The Bengkulu worm infection rate for SHSP students was 35% followed by West Sumatra at 20%. Mercy Corps believes that worm infection was relatively low in West Sumatra because the government recently conducted a deworming campaign in a large percentage of their schools.

Table 1. Number/Percentage of Worm Incidents Among SHSP Students

Province	<i>Ascaris Lumbricoides</i> (Round Worm)	<i>Ankylostoma Duodenale</i> (Hookworm)	Other types of worms	Number/Percentage of SHSP kids with worms ^{6,7}
Riau	196 (41%)	58 (12%)	7 (1.5%)	228 (48%)
Bengkulu	184 (32%)	3 (0.5%)	15 (3%)	198 (35%)
Lampung	209 (38%)	11 (2%)	46 (8%)	257 (47%)
West Sumatra	139 (19%)	0 (0%)	5 (0.7%)	143 (20%)
Grand Total	728 (31%)	72 (3%)	73 (3%)	873 (38%)

⁵ The type of pill distributed to the SHSP students was Pyrantel

⁶ Mercy Corps tested the following numbers of SHSP children in the target four provinces: 479 in Riau, 571 in Bengkulu, 551 in Lampung and 717 in West Sumatra.

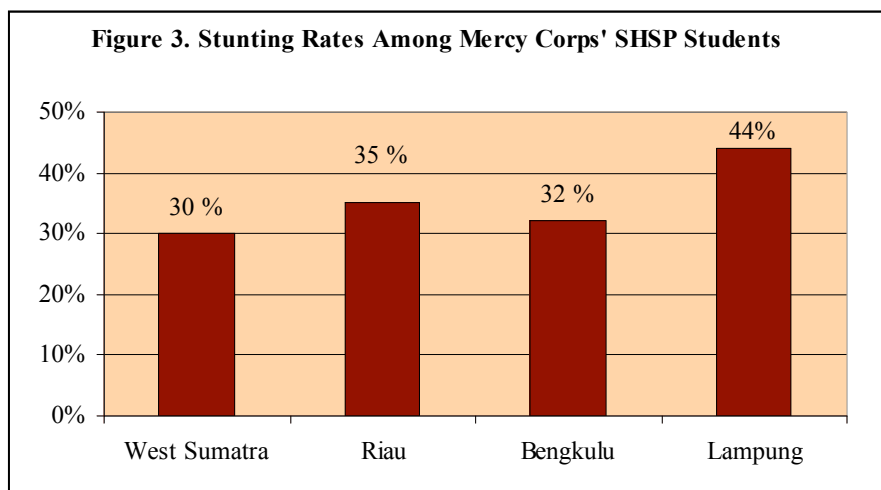
⁷ Some children had more than one type of worm infection

As reflected in the chart above, the most common type of worm infection found in SHSP students was *Ascaris Lumbricoides* (round worm). In Riau, 12% of the surveyed SHSP population tested positive for *Ankylostoma Duodenale* (hookworm). We single out hookworm since this parasite causes bleeding which can lead to anemia and because it can have particularly devastating effects on school-age children, causing lower test scores and cognitive function. A total of 71% of SHSP students with hookworm were also anemic. Therefore, there is a strong correlation between hookworm and anemia, stressing the importance of addressing the specific problem of hookworm infection. Some SHSP children (47 total) tested positive for more than one type of worm, which was particularly evident in Riau Province. In comparison to CARE’s 2005 baseline survey in three districts of Aceh Province, CARE found similar or higher worm infection rates than those found in Mercy Corps’ SHSP baseline. Among CARE’s baseline population of children 5-14 years old, worm infection rates varied depending on the district surveyed: Banda Aceh (28%), Aceh Besar (77%) and Simeleu (74%) (CARE International Indonesia, 2005).

Malnutrition

Mercy Corps and the local Department of Educations took age and anthropometric measurements (weight and height) of 2,304 SHSP students. Mercy Corps categorized its findings using the Z-score methodology or the standard deviation score. This methodology measures how far and in which direction a child’s nutritional status deviates from the mean on the internationally recommended reference population of other children with the same age.

Mercy Corps’ most significant anthropometric baseline finding was the high levels of stunted⁸ children within the four provinces. Stunted growth signifies the failure of a population to grow linearly, which reflects prolonged poor socioeconomic conditions and increased risk and exposure to illness and/or inappropriate feeding practices. This can be attributable to chronic malnutrition over a prolonged period of time within the population, arguing the need to address chronic food shortages, micronutrient deficiencies and diseases burden. **In general, Mercy Corps found stunting levels ranging from 30-35% depending upon the province: West Sumatra (30%), Bengkulu (32%) and Riau (35%). One province—Lampung Province—had significantly higher levels of stunted students. Mercy Corps found stunting levels at 44% there as shown in the chart below.**



⁸ Mercy Corps measured stunting by taking height-for-age measurements. Height-for-age measures whether or not a child has been malnourished some time in his/her past. Scores (realized by taking weight-for-age that are one standard deviation below the norm (<-1 Z scores) are considered mildly malnourished, two standard deviations (<-2 Z scores) are moderately malnourished and three standard deviations (<-3 Z scores) are severely malnourished.

Table 2. Nutritional status of surveyed SHSP children in Sumatra:

	Province			
Indicator	West Sumatra	Riau	Bengkulu	Lampung
Stunting (%)	30%	35%	32%	44%
Underweight (%)	22%	28%	24%	28%
Wasting (%)	3%	3%	3%	2%

Conclusion

Mercy Corps' assessment was a first step in understanding some of the health problems that affect students participating in the SHSP program. Anemia and stunting rates are alarming and undoubtedly contribute to decreased educational achievement and lost productivity in these provinces of Sumatra. Upon completion of its baseline survey, Mercy Corps shared province-specific results with local government and advocated to them to improve these serious health indicators. In addition to mobilizing government to address these serious health issues, Mercy Corps is in the process of revising its fortified soy milk formula to increase the amount of vitamins and minerals in the formula (i.e. iron, vitamin A, vitamin C and zinc) in order to have maximum impact on children's health. Mercy Corps is also planning a deworming campaign in its target schools given the high levels of worm infection throughout the four target provinces. Mercy Corps is working with parent teacher committees and students to provide hygiene and nutrition education to children in schools, with the intent that these new behaviors will be adopted at home as well. Mercy Corps' efforts will improve students' health over the short-term, however, long-term positive impacts will depend upon the degree to which the government, local civic and private sector partners, and communities themselves internalize these issues for action. Mercy Corps will conduct a midline assessment in 2006 and an endline assessment in mid 2007 to assess changes in these health indicators over time.