

EVALUATION OF NUTRITION SURVEILLANCE INDICATORS¹

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Simple, readily available data from outpatient health clinics may provide useful information about a population's nutritional status. Preliminary information from El Salvador suggests that two indicators—based on clinical weight-for-age data and clinically diagnosed malnutrition cases—could be useful for that purpose.

Introduction

There has been increasing recognition of the need for nutrition surveillance as a basic element of nutrition evaluation and planning. A World Health Organization monograph on the subject (1) outlines how such surveillance might be carried out, emphasizing that nutrition surveillance should be a multisector activity that monitors agricultural and economic indicators relating to causes of malnutrition as well as health indicators reflecting the effects of malnutrition.

Development of comprehensive and credible surveillance systems will require the evaluation of possible indicators from all these sectors. As a first step toward this ultimate objective, the study reported here evaluated indicators obtained solely from

within the health sector in terms of their usefulness for monitoring changes in nutritional status. Various indicators have been proposed for this purpose—including infant and childhood mortality, the incidence of low birth-weights, and the height of children entering school. However, these indicators have numerous potential weaknesses, and in many cases the data required to generate them are not readily available.

Another type of information about nutritional status that might be used for surveillance purposes is data derived from outpatient health clinics. Such data include those derived from reported cases of clinical malnutrition and weight-for-age data on preschool children attending clinics. There have been well-deserved reservations about employing these types of data, since the techniques used to collect them may be poorly standardized and since health data from clinic attendees may not reflect the general population's health or nutritional status.

On the other hand, clinic data have important potential advantages. One advantage is that they relate specifically to malnutrition rather than to general health. Another advantage, of even greater practical importance, is that these data are routinely collected and readily available, so there is no need to initiate and maintain a new data system.

Any nutrition indicators derived from routine health clinic data require evaluation to determine their worth for monitoring nutritional status. The central objective of

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our study was to make such an evaluation of indicators based upon routinely collected data from outpatient clinics in El Salvador. More specifically, the study evaluated the indicators' ability to reflect regional differences and seasonal changes in nutritional status. Our basic hypothesis was that such data might prove useful not as a precise evaluation tool, but rather as a practical guide to broad trends in the prevalence and distribution of malnutrition.

Methodology

Five geographically distinct regions of El Salvador were defined in the course of an assessment of nutritional conditions made by the Institute of Nutrition of Central America and Panama (INCAP). The five regions included a marginal agricultural area in the country's mountainous northern frontier, a more central area of marginal agriculture where some cash crops were also grown, a coffee-growing area in the country's central mountains, an area of intensive cash crop agriculture along the Pacific Coast, and an urban slum area on the outskirts of San Salvador, the capital city. These areas were respectively designated as the Northern, Central, Coffee, Coastal, and Urban regions.

In each region, 30 to 40 sample sites were selected, the probability of selection being based on each site's population. At each site a randomly chosen group of households was visited, and all children 6–59 months of age in these households were measured until data from approximately 40 children had been gathered. The measurements included each child's weight, height, and mid-upper arm circumference. Weight measurements were made by suspending the child in a cloth sling and determining the weight with a Salter spring-type scale. Height measurements were made with a portable measuring board. Arm circumferences were determined using an insertion-type tape measure developed for this purpose (2). Age was determined by questioning the mother or the responsible adult caring for the child, a satisfactory method in this

culture where birthdays are generally known. All the measurements were made by a two-man team trained in anthropometric techniques in a pilot area. Anthropometry data were analyzed using the Iowa reference population data adopted by INCAP (3).

In the same five regions, data from a sample of 44 government health clinics were collected. These were used as the basis for calculating nutritional status indicators that could then be compared with the measurements obtained in the field. In collaboration with the Ministry of Health, each sample clinic was visited and clinic records were reviewed. From those records we obtained the recorded weight and age of each child 12–59 months of age who received a medical examination in 1975–1976 and the date of that examination. The weight-for-age or "Gómez" (4) nutrition grade calculated by the clinic nurse was recorded for comparison with the computer-calculated weight-for-age grade.

One indicator of the clinic attendees' nutritional status was derived by calculating the percentage of children examined who had weight-for-age values less than 75 per cent of the Iowa reference standard. This indicator was termed the weight-for-age index.

A second indicator of the clinic attendees' nutritional status was derived from clinical diagnoses of malnutrition made by Ministry of Health physicians in those clinics. Computerized Ministry of Health data from each sample clinic were tabulated to show the percentage of that clinic's attendees in the 12–59 month age group who were clinically diagnosed as malnourished during 1975 and 1976. Only the results of initial visits were tabulated; data from subsequent follow-up visits by the same child were excluded. Like the weight-for-age indicator, the indicator based on the percentage of clinic attendees clinically diagnosed as malnourished was compared with the field survey data.

The percentage of clinic attendees with clinically diagnosed diarrheal disease was also tabulated—for purposes of comparison with these two nutrition indicators. Because of possible seasonal variability in nutritional

conditions (5), the two nutrition indicators and the diarrheal disease indicator were tabulated for the same three-month period in which the field survey measurements were made.

Results

A comparison of the nutrition status indicators with field survey measurements is presented in Table 1. The malnutrition prevalence survey of 1976 indicated the geographic areas studied could be segregated into two kinds of regions: higher-prevalence regions (the Central, Northern, and Coffee areas) with malnutrition prevalences ranging from 22.6 to 24.9 per cent and lower-prevalence regions (the Urban and Coastal areas) with malnutrition prevalences ranging from 13.9 to 15.3 per cent. The observed differences between malnutrition prevalences in these two sets of regions was highly significant ($p < 0.01$).

The clinic weight-for-age indicator showed similar patterns of high and low prevalence for both 1975 and 1976. However, the malnutrition prevalences obtained for each region with this indicator were consistently about

twice the prevalences detected by the field survey for that region.

The clinical diagnosis indicator did not provide results that were consistent for both years studied, nor did it detect the high and low regional patterns brought out by the weight-for-age indicator.

Evaluation of diarrheal disease in the clinic populations (see Table 1) indicated that in 1975 diarrhea prevalences followed the same relatively high and relatively low regional patterns defined by field data and the weight-for-age index. The same was true of the 1976 diarrhea data with one notable exception—the Northern region, which showed a relatively low diarrhea prevalence that year but a relatively high prevalence of malnutrition.

Over the three-month period for which field survey data were tabulated, the diarrhea prevalences shown did not correspond closely with prevalences of clinically diagnosed malnutrition. However, when the combined clinical data (from all the regions) were viewed over a two-year time span, a relationship could be observed between the prevalences of diarrhea and of clinically diagnosed malnutrition (Figure 1). Peak diarrhea prevalences preceded peak clinical malnutrition preva-

Table 1. A comparison of nutritional field survey data with two nutritional indicators and diarrheal disease data derived from clinic records in five regions of El Salvador for children 1-4 years of age in 1975 and 1976.

Region	Months for which data apply	Field survey data: % of children below 75 % of Iowa standard weight for age, 1976	Surveillance indicators derived from clinic records					
			% of children below 75% of Iowa standard weight for age		% of children diagnosed at the clinic as malnourished		% of children with diarrhea	
			1975	1976	1975	1976	1975	1976
<i>Higher-prevalence regions:</i>								
Central	May-July	24.9	44.4	42.1	12.2	12.8	21.6	25.5
Northern	May-July	22.7	59.6	47.5	22.9	38.1	23.4	13.7
Coffee	May-July	22.6	41.4	42.7	22.0	26.6	24.3	22.9
<i>Lower-prevalence regions:</i>								
Urban	May-July	15.3	36.2	27.6	16.3	20.8	11.0	17.6
Coastal	Jan-March	13.9	34.0	28.4	16.0	26.5	10.0	15.0

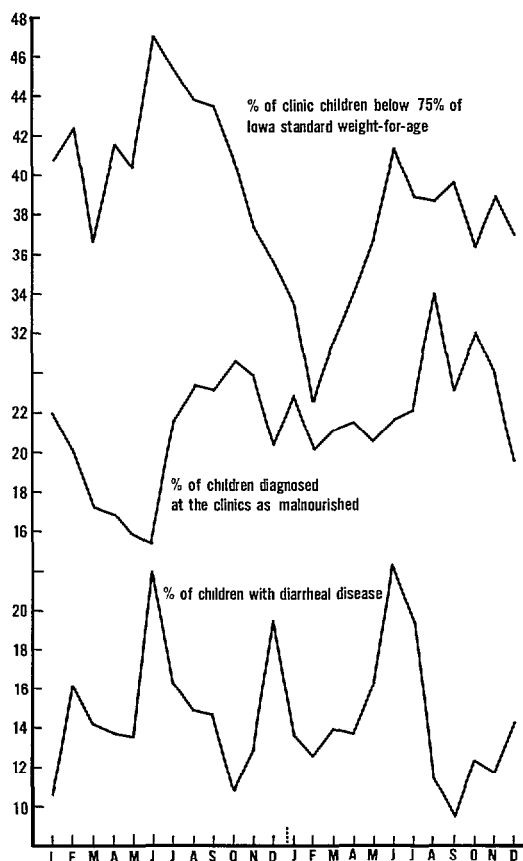


Figure 1. Malnutrition indicator findings and recorded diarrheal disease prevalences for children 1-4 years of age in the Salvadorean clinics surveyed, by month, in 1975-1976.

lences by several months, but both showed distinct and related seasonal patterns.

Comparison of weight-for-age grades of malnutrition calculated by the clinic nurses and by a computer operator using the same data indicated a high degree of correspondence between the two (Table 2). Overall, examination of data from 3,672 children 1-4 years of age revealed no significant difference between nurse-calculated and computer-calculated results.

Discussion

The correlation between the clinic weight-for-age indicator and the field nutrition measurements supports the contention that

this indicator is useful and valid for nutrition surveillance. Also, the indicator's consistency over the two years studied suggests that it reflects real and persistent nutritional characteristics of the study regions involved. The relationship between malnutrition, as reflected by this weight-for-age indicator, and diarrhea is consistent with the frequently observed link between diarrhea and malnutrition.

Nevertheless, the apparent advantages of the weight-for-age indicator must be balanced against its potential weaknesses. The fact that an association between the indicator and field measurements was found in this study provides no assurance that such an association would necessarily be found in other countries. Also, it is necessary to qualify the findings with important reservations concerning the representativeness of this type of health clinic data and the accuracy and reliability of the weight measurements recorded.

The less precise correlation between the clinical diagnosis indicator and the field survey measurements suggests that this indicator may provide a less useful reflection of current nutritional status. Difficulties such as physicians' subjectivity and lack of standardized methods in diagnosing malnutrition could partly account for this indicator's apparent insensitivity.

However, when viewed longitudinally over a two-year period, the relationships between the percentage of children with clinically diagnosed malnutrition, a weight-for-age deficit, and diarrhea appear more intelligible. Overall, the diarrhea prevalence peaked first—in June of each year—followed closely by the prevalence of weight-for-age deficits. Clinically diagnosed malnutrition was observed to peak several months later and tended to persist longer, perhaps because it took time for clinically obvious signs of malnutrition to appear and to be resolved. This delayed seasonal rise in clinical malnutrition may explain its lack of association with the weight-for-age indicator and the diarrheal disease prevalence in short-term studies. In fact, the clinical diagnosis indicator may be a

Table 2. A comparison of nurse-calculated and computer-calculated grades of malnutrition based on the same weight-for-age data from children 1-4 years of age in El Salvador, 1975-1976.

Processor of weight-for-age data	No. of children	% in different nutritional categories (Gómez classification)			
		0	I	II	III
Nurse	3,672	18.7%	42.6%	32.3%	6.4%
Computer operator	3,672	18.4%	43.6%	30.4%	7.6%

valid indicator for use in surveillance of nutritional status, but one that cannot be expected to reflect short-term changes in nutritional conditions.

The surveillance indicators' detection of seasonal malnutrition and diarrhea patterns has potential practical significance for planning. Knowledge of seasonal prevalence peaks may help key maximum supplementary food and medical assistance to times of maximum nutritional hardship. The surveillance data may also help planners to define regions where nutritional conditions are most severe and to evaluate long-term nutritional changes.

The close correlation between nurse-calculated and computer-calculated weight-for-age grades also has potential practical significance. Our results suggest that readily available nurse-calculated nutrition grades could be used for surveillance by local and regional personnel without need of computer assistance.

Conclusions

The results of this study suggest that simple and readily available data from government

health clinics can be used in nutritional surveillance to derive indicators of nutritional status. The most sensitive indicator of the two assessed appears to be that derived from weight-for-age data. We found this indicator to reflect measured regional differences in malnutrition as well as seasonal changes in nutritional status. The surveillance indicator derived from clinical diagnosis data did not reflect regional differences in malnutrition and appears unsatisfactory for that purpose. However, when observed over a prolonged period, the clinical diagnosis indicator was found to reflect seasonal changes in malnutrition. This suggests that although it may be less sensitive to acute nutritional changes, the clinical diagnosis indicator might still play a useful role in detecting relatively long-term trends.

Of course, these results from El Salvador do not necessarily ensure that similar indicators derived from routinely reported health clinic data would be equally useful or valid in other countries. But their demonstrated usefulness and practicality in El Salvador does suggest that similar data in other countries merit evaluation for possible use in simple and practical systems of nutrition status surveillance.

SUMMARY

One type of information about nutritional status that might be used for surveillance purposes—and that might prove useful for evaluators and planners—is data derived from outpatient health clinics. The study reported here compares two types of

clinical data (weight-for-age data and data on reported cases of clinically diagnosed malnutrition) with the results of a nutritional field survey. These clinical and field data were obtained from health clinics and households in each of five geographic

regions of El Salvador. The field surveys were conducted during 1975-1976, and the clinical data analyzed pertained to those years.

The results of the comparison suggest that simple data readily available at government clinics can be used to derive acceptable indicators of a population's nutritional status. Of the two possible indicators assessed, the most sensitive appeared to be that derived from clinical weight-for-age data. For the Salvadorean areas studied, this indicator showed both regional differences in the prevalence of malnutrition and seasonal changes in nutritional

status. The other indicator, derived from clinically diagnosed cases of malnutrition, did not register these regional differences but did show seasonal changes. Despite its limitations, it appears that this latter indicator may still play a useful role in detecting relatively long-term trends.

Of course, there is no guarantee that these indicators will prove equally valid in other circumstances and countries. But their demonstrated value in El Salvador does suggest that similar data in other countries merit evaluation for possible use in monitoring nutritional status.

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MONITORING OF PSYCHOTROPIC DRUGS

A World Health Organization Expert Committee meeting in Geneva on 15-20 September 1980 has called for continuous monitoring of psychotropic drugs. WHO monitoring is needed, the committee says, to clearly establish causal relationships between drug use and the social and public health problems that have become associated with drug-taking.

At present, the major obstacle to weighing a drug's capacity for harm against its potential benefits is the absence of uniform and reliable data. In general, information is lacking on the quantities of potentially harmful drugs produced, the ways they are distributed, the manner in which they are prescribed, and some of their possible effects. Among other things, the committee asserted, "further research is required to ascertain the role of psychotropic drugs in road traffic accidents."

Such data would help determine whether a drug should be subject to control under the 1971 Convention of Psychotropic Substances, a convention that gives WHO a mandate to recommend control measures when a drug is known to be a threat to public health and social welfare. Thus far in 1980, international control has been recommended for five psychotropic drugs. Among these is phencyclidine, commonly known as "angel dust," a drug manufactured for veterinary purposes that has come to be widely abused by young people in North America.

Source: WHO, Press Release WHO/20, 9 October 1980.