

Community Growth Monitoring

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Abstract

Background: For a decade the effectiveness of growth charts has been questioned. Along with the purpose of assessing the growth patterns of children, growth charts were considered to be an educational tool. With low levels of literacy in developing countries, and consequently a minimum understanding of growth charts by mothers, they have had limited effectiveness. The practice is also time-consuming and resource intensive.

Objective: In wake of the importance of monitoring the growth of children, yet keeping in mind the ineffectiveness of growth charts, a novel method of monitoring the growth of children has been demonstrated in this article.

Setting: Urban squatter settlement covering a population of 10,000 people of low-income families.

Methods: Secondary school educated females were trained to give primary health care to their neighboring families and they were paid by a 'Health Insurance' system devised locally. As part of the PHC program a novel method of growth monitoring was tried in the form of "Community Growth Monitoring".

Conclusion: Community Growth Monitoring requires less time and is effective in measuring the growth of children of a community as a whole, rather than the individual child. This is demonstrated as a process indicator of nutrition counseling, used as an intervention in the community (JPMA 50:188, 2000).

Introduction

Growth monitoring has been advocated as an effective, simple and inexpensive way of preventing most childhood malnutrition. But this view has been questioned because of the lack of evidence of the fact that growth charts are a better educational tool than health and nutrition education without growth charts^{1,2}

The understanding of growth charts has been proven to be in proportion to the level of the literacy of the mothers. Studies report that growth, as measured by change in weight-for-age, was no different in children whose mothers understood the chart and those who did not^{3,4}. Since explanation of charts to the mothers uses staff time, more important activities tend to be neglected. As one of the basic purposes of the growth chart is to educate mothers regarding the growth of the children and in this way motivate them to take appropriate action, lack of understanding by mothers does not achieve this purpose⁵. In addition individual growth monitoring is resource intensive, as it requires more manpower and printed growth charts for every child. In resource depleted health systems, like that of Pakistan, this becomes impossible. Thus many times growth monitoring is not practiced.

The ineffectiveness of growth charts also lies in the fact that more time is spent in weighing and charting individual children's weight, thus leaving very little time to focus on the actual analysis of the charts, provide services to those whose weight is faltering and follow-up activities. Therefore individual growth monitoring may not be an appropriate method of measuring growth in such health settings. Community Growth Monitoring can achieve the objective.

The concept of community growth monitoring is based on monitoring the growth of a community instead of an individual. In community growth monitoring, a predetermined number of children in each age group (determined by age specific population of the community) are weighed periodically. An average weight and standard deviation is determined for each age group, at successive points in time.

Therefore changes in the average weight-for-age or weight-for-age Z-scores can be compared over a length of time. This would show positive or otherwise trends in nutrition status of children at specific ages, reflecting the effectiveness of nutrition intervention activities in a given community.

This paper uses the data of Neelam Colony to show the effectiveness of this technique. The weight of children ages 0-5 years has been ascertained in two successive points in time 1992 and 1995. It shows the change in the nutrition status of children after the initiation of nutrition counselling and primary health care activities for mothers and children in the area.

Methodology:

This study was carried out in an urban squatter settlement in Karachi, Pakistan. 'Neelam Colony is a typical urban slum area with a population of 10,000. A Primary Health Care Program (PHC) was initiated in Neelam Colony in 1989.

With the aim of obtaining self-sufficiency and sustainability females identified by the community were trained in the first phase. These Community Health Workers (CHWs) were given training in preventive health care including breast feeding and its promotion, complementary feeding, growth monitoring, nutrition counselling, prevention of diseases, use of ORS, immunization, recognition and management of acute respiratory tract infections and first aid.

After initial training the CHWs have initiated health centers in their homes. The lady health visitors (LI-IVs) and doctors regularly supervise these health centers. All children under five years of age are weighed regularly on Salter scales, provided to them through the PHC Program. A growth chart and a health information proforma are maintained for each child.

For the purpose of this study, the 'weight-for-age data of two groups of children aged between 0-5 years seen in 1992 and 1995 has been analyzed using the SPSS statistical package and Epi Info. It demonstrates how community based data (as opposed to a single child's weight-for-age) can be used to measure changes over time. The difference in weight-for-age, of specific ages was compared. The acquired data was divided in four groups: normal, grades 1, 2 and 3 of malnutrition, using the Modified Goniez Classification of expected weight-for-age in children. All children of specified ages attending health centers were weighed in 1992 and 1995 (Tables 1 and 2). Similar cross-sectional or panel studies can be done each year. The results can be compared annually to see the overall effectiveness of the intervention program and determine changes in the nutritional status of the community as a whole rather than the individual child.

Results

A total of 137 children under five years of age were weighed in 1992 and 187 in 1995. The age-specific break-up was based on the number of children of the specific ages reporting to the health centers. This break-up may not be representative of the community target population.

Of the 324 children, 48.4% were males and 51.2% were females. The weight of males and females was plotted against the NCHS standards. In males and females the 10th NCHS percentile corresponds to the 50th percentile of the study sample. While the 50th NCHS percentile corresponds to the 90th percentile of the study children.

A total of 32% and 30% children were malnourished in 1992 and 1995 respectively. Of these 2% and 3% were severely malnourished. Females were more malnourished than males, but the difference was not significant (Table 3).

Table 3. Nutritional Status of Children under five 1992 vs 1995.

	% 1992 n = 137	% 1995 n = 187	p-value
Normal	67.9	69.5	N.S. (0.76)
Grade 1	18.2	19.8	N.S. (0.72)
Grade 2	11.7	7.5	N.S. (0.34)
Grade 3	2.2	3.2	N.S. (1.0)

N.S. = not significant

The rate of malnutrition for both males and females was high between age 7 months and 36 months. Of significance is the fact that 20.7% of all malnourished children fall into a single age bracket of 10-12 months. Corresponding to this is the declining practice of breast-feeding at this age.

The results obtained by 'Community Growth Monitoring' of children, both males and females, in 1992 have been compared with the nutritional status of children of similar ages in 1995 (Tables 1 and 2).

Table 1. Males 0-5 years 1992 and 1995.

Age	Total		Normal		Grade I		Grade II		Grade III	
	1992	1995	1992	1995	1992	1995	1992	1995	1992	1995
< 6 m	12	5	84%	60%	8%	20%	0%	0%	8%	20%
7-12 m	30	7	60%	100%	27%	0%	13%	0%	0%	0%
13-24 m	17	20	60%	75%	29%	15%	6%	10%	0%	0%
25-36 m	8	14	88%	72%	12%	21%	0%	7%	0%	0%
37-60 m	10	25	50%	80%	20%	12%	30%	8%	0%	0%

N 1992 = 77

N 1995 = 71

Table 2. Females 0-5 years 1992 and 1995.

Age	Total		Normal		Grade I		Grade II		Grade III	
	1992	1995	1992	1995	1992	1995	1992	1995	1992	1995
< 6 m	10	12	90%	83%	20%	17%	10%	0%	0%	0%
7-12 m	16	1	56%	59%	13%	23%	25%	0%	6%	18%
13-24 m	12	36	50%	61%	17%	19%	25%	17%	8%	3%
25-36 m	6	30	100%	64%	0%	23%	0%	10%	0%	3%
37-60 m	6	21	67%	66%	33%	33%	0%	0%	0%	0%

N 1992 = 50

N 1995 = 116

In the year 1992 a total of 77 male children attended the health centers. Out of these, 51 (66.2%) had normal weight for their respective ages, whereas 26 (33.8%) were malnourished. In 1995 a total of 71 male children of the same age groups were monitored. Of these 55 (77.5%) were normally nourished and 16 (22.5%) were malnourished. Thus, there seems to be an improvement in the nutritional status of male children in Neelam Colony, after a period of 3 years. but the difference between the two proportions is not significant (two-tailed t-test). In addition to changes in the nutritional status of children between 0-5 years, age-specific or sex specific changes over a period of time can also be determined by using collective data at different points in time.

In the case of female children, the improvement in the nutrition status was less significant. In 1992 out of a total of 60 female children, 42 (60%) were normally nourished, whereas 18 (40%) were malnourished. In 1995 a total of 116 female children attended the health centers and 75 (64.7%) had normal weights for their ages, whereas 41 (35.3%) were under-weight. The change in the nutritional status is not significant. One reason for this is that the sample size was small. To detect a statistically significant change in the nutritional status of children, a large sample size is required.

In Table 3, the percentage of children; both male and female are classified according to their nutritional status in 1992 and compared with those in 1995, irrespective of their ages. There is a slight increase in the number of children with normal weight-for-age and a significant decrease in grade 2 malnutrition. Although there is no specific pattern, there is an overall improvement, but this is not significant.

Discussion

Anthropometric data is essential to ascertain prevalence of malnutrition in a community. A cross-sectional study by Khan et al⁶ on Pakistani children from upper-middle socio-economic strata showed clearly that with appropriate feeding the weight of Pakistani children was comparable to that of the NCHS standards. In another longitudinal study by Akram and Agboatwalla on more than one thousand children followed for five years, they demonstrated similar results with height, weight and occipital-frontal circumference. The major difference between these two studies and the present sample of children is the socioeconomic background. Children in the present study are exposed to poor sanitation, over-crowded housing and hence infections, which are the major contributors of malnutrition and subsequent growth retardation. In addition to changes in the nutritional status of children between 0-5 years, age-specific or sex specific changes over a period of time can also be determined by using collective data at different points in time.

In a similar study on Dominican children by Hollak et al⁸ the mean weight of the children followed the 25th percentile of NCHS standards. They showed that apart from socio-economic differences, ethnic and social backgrounds also have a profound effect on the nutritional status of children.

A trend identified in this cohort is that more children were under weight from the age of 7 months with 20.7 per cent malnourished children in the 10-12 months age bracket. Boldwin et al⁹ studied South East Asian refugees in the USA and found that the weight of his study children was comparable to NCHS standards upto 6 months, after which their growth slowed down. Similar findings were reported by Rowland et al¹⁰ They attributed this to increased incidences of illness and poor quality of complementary foods. The growth pattern of the children in the studied cohort and that reported by the above quoted studies is similar. In Pakistan the usual age when complementary feeds are added varies from 3 months to 9 months. Complementary foods themselves are low in calories and lead to a decrease in breast-feeding. They may themselves be a source of infection. National data shows that at 10-12 months of age, only 51 percent mothers are still breast-feeding¹¹. These factors collectively can lead to malnutrition after 6 months of age.

There are very few studies in literature, where a community growth monitoring concept has been tried. A study done in Gaza between 1987-92 used a similar methodology to demonstrate nutritional differences between two cohorts before and after a nutrition intervention program¹².

Growth monitoring of individual children, although a good counselling tool has its limitations. Especially in developing countries with large rural populations, where access to health facilities is difficult, where populations in both urban and rural settlements move for employment and better opportunities. Monitoring of individual children as a means of ascertaining the efficacy of health care measures then becomes inaccurate. It is impossible to judge whether the nutrition status of children in a community has improved over a period of years, using individual monitoring¹³.

A logical solution then is the periodic weighing of a number of children from the same population, with age-specific weights taken at intervals of time. This has been termed as Community Growth Monitoring'. As has been demonstrated above, by taking age-specific weights of children at an interval of three years, a slight decrease in the percentage of moderately and severely malnourished children, both males and females, was identified. Overall improvement is not significant.

Thus decrease in the number of malnourished children, or increase in the total "normal weight-for-age" children is an appropriate indicator of the health status of the community. Similarly an average age-specific weight-for-age Z score of a number of children could be ascertained to give an indication of improvement in the community as a whole over a period of time.

In addition, the biases that are encountered in longitudinal data i.e., drop outs from a study (attrition), are not of concern in community growth monitoring method. This is because in community growth monitoring it is not the individual that is important, but the community' as a whole that is of importance. It is therefore, an important process and outcome indicator for implementers to assess the effectiveness of nutrition promotion activities of children of a community collectively, rather than individually.

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