

A community nutrition project in Viet Nam: effects on child morbidity

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To reduce vitamin A deficiency in Viet Nam, a community nutrition project was implemented from 1991 to 1993. The project activities included:

- raising household garden production, particularly of carotene-rich fruits and vegetables;
- nutrition education of mothers of children five years of age and under;
- baseline and follow-up monitoring of vitamin A status, household garden production, food intake and growth patterns of young children.

The data from the Nutrition Improvement Project provided a rare opportunity to monitor the effects of community nutrition education and family gardening on morbidity in young children. Acute respiratory and diarrhoeal infections are the major causes of mortality in infants and young children in Viet Nam (Viet Nam Ministry of Health, 1993), as in many other developing countries. This article describes the Nutrition Improvement Project and a separate study that assessed the project's impact on acute respiratory and diarrhoeal infections in children.

NUTRITION IMPROVEMENT PROJECT

The Nutrition Improvement Project was implemented in four communes and included a total of 5 588 households with 3 716 young children (FAO, 1992). The communes were selected to represent different ecological and cultural regions of the country. In the north, the project was implemented in Thanh Hoa District in Vinh Phu Province, a hilly area, and in Vu Ban District in Ha Nam Ninh Province, in the Red River delta area. Project areas in the central region of Viet Nam included Tuy Phuoc District in Binh Dinh Province, on the coast, and Bas Dinh District in Thuan Hai Province, in a dry zone (Figure 1).

With assistance from FAO and funding from the Government of Australia, the National Institute of Nutrition (NIN) and the National Institute of Fruit and Vegetable Production (NIFVP) coordinated and executed the project in Viet Nam. National-level steering committees comprised representatives from the Ministries of Health and Agriculture, the State Planning

Committee and the Women's Union. Local representatives from these organizations plus the People's Committee (local government) and the National Association of Vietnamese Gardeners (VACVINA) directed the project in each commune.

Household gardens

VACVINA promoted the establishment and improvement of household gardens based on the VAC ecosystem, a system developed in Viet Nam to promote a diet that is more diversified and balanced than the traditional diet, which is based mainly on rice. The system encourages the combination

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Provinces of Viet Nam where the Nutrition Improvement Project was implemented



of horticulture (V for *Vuon*, meaning garden), pond culture of fish and other aquatic animals (A for *Ao*, meaning pond) and small-animal husbandry (C for *Chan nuoi*, meaning animal husbandry) within the household garden. The promotion efforts were especially focused on families with young children. Nutritious foods rich in carotene (precursor of vitamin A), dietary fat, vitamin C, iron or protein were identified for production in family gardens. Nursery gardens were established to provide seeds and seedlings, and demonstration gardens were set up. Ministry of Agriculture and VACVINA extension workers underwent training and received technical support from the NIFVP specialists.

Nutrition education

Family feeding problems were identified and nutrition education materials on breastfeeding, weaning foods, maternal diet during pregnancy and lactation, and food preparation and hygiene were prepared (Figure 2). With training and technical support from NIN specialists, volunteer community educators undertook nutrition activities with small groups of mothers. The activities included education on growth monitoring, demonstrations of the preparation of weaning and other foods, group discussions on healthy family diets, contests to see whose baby grew the most and listening to radio spots.

Monitoring and evaluation

Baseline data were collected in 1991 and follow-up data were gathered in 1993 for monitoring and evaluation of the impact of the activities. Information was collected on household food

production and use, nutritional knowledge of mothers, dietary intakes of the family and young children (based on 24-hour recall) and the nutritional status (height, weight and eye examination for vitamin A deficiency prevalence) of young children.

An analysis of the baseline and follow-up data showed significant increases in the production of fruits, vegetables and other foods from family gardens; increases in the intake of foods containing iron, vitamin C, carotene and protein among households with young children; and improvements in nutritional status of young children and nutritional knowledge of mothers (FAO, 1993).

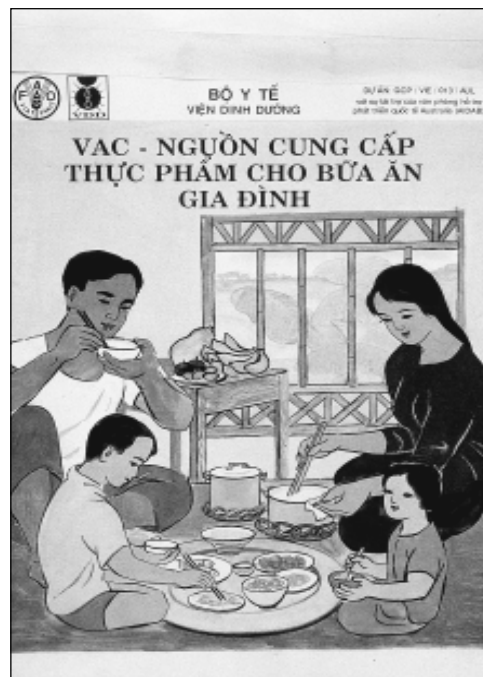
SURVEY ON MORBIDITY OF YOUNG CHILDREN

The body's immune defence system, which protects against colonization and tissue invasion of infectious agents, is remarkably effective in a well-nourished host. Improving nutritional status is a strategy for infectious disease control, as deficiencies of protein and energy and a number of micronutrients (particularly vitamins A and C, iron and zinc) compromise the immune system and, in many cases, the integrity of epithelial tissues, which lowers defences to pathogenic invasion (Tomkins and Watson, 1989).

While children's growth patterns have been measured to assess the impact of nutrition programmes, there has been a dearth of reports on the relationship of nutrition programmes, dietary improvement and their impact on morbidity in young children.

Although not part of the project itself, a morbidity survey

2
Nutrition education
materials designed,
tested and printed
locally



monitored the incidence and severity of acute respiratory infection (ARI) and the incidence of diarrhoeal disease (DD) in Khai Xuan, one of the four project communes, and in a control commune, Ching Cong. The project and control communes, both located in the same district of Vinh Phu Province, were similar in terms of health services, water and sanitation.

NIN, the National Institute of Hygiene and Epidemiology and the National Institute of Tuberculosis and Respiratory Diseases developed the methodology following the World Health Organization's protocol for measuring the incidence of acute respiratory infection and diarrhoeal disease (WHO, 1986). Village health workers were trained to conduct interviews with mothers or other care providers about the incidence of infection in young children during the previous two weeks. A diarrhoeal condition was defined as the passing of four or more stools a day. Respiratory infection was identified as the presence of cough and fever; questions were asked about rapid breathing (pneumonia) and chest indrawing (severe pneumonia) to assess the severity of the illness.

Analysis

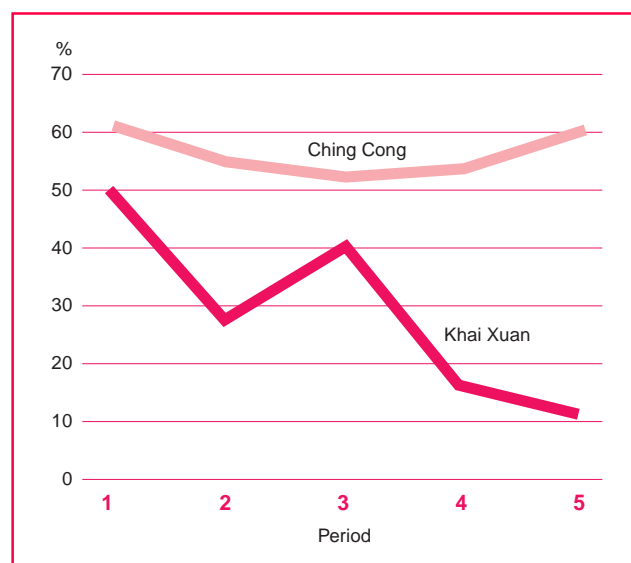
The survey included five data collection periods of three months each. The mean sample size was 469 children in Khai Xuan and 251 children in Ching Cong.

The incidence rates of infection in the two communes in the earliest periods of data collection were similar. By the last data collections, the survey showed a highly significant reduction in the incidence and severity of ARI and in the incidence of DD in the project commune: the incidence of ARI had decreased from 49.5 to 11.2 percent and that of DD from 18.3 to 5.0 percent. The incidence of pneumonia and severe pneumonia was also very significantly reduced in the project commune. There was no statistically significant change in the incidence and severity of ARI or the incidence of DD in the control commune. Figures 3 and 4 illustrate the trends in the incidence of ARI and DD in the project and control communes over the period of data collection.

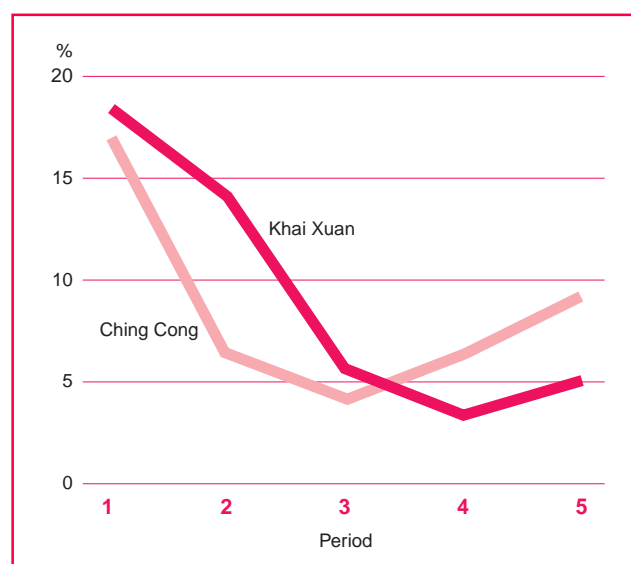
The similarity in infection rates at the beginning of the survey may indicate that after home garden production and nutrition education programmes had commenced, a considerable amount of time was needed before they affected food intakes and immune function.

IMPACT OF THE NUTRITION PROJECT ON MORBIDITY

Data on household food production, the nutritional knowledge of mothers, dietary intakes of households and the nutritional status of young children in Khai Xuan and Ching Cong were compared to explain the significant differences in morbidity trends between the project and control communes.



3
Incidence of acute respiratory infection (ARI) reported in each data collection for the previous two weeks in project (Khai Xuan) and control (Ching Cong) communes



4
Incidence of diarrhoeal disease (DD) reported in each data collection for the previous two weeks in project (Khai Xuan) and control (Ching Cong) communes

Baseline and follow-up data on production and utilization of food from household gardens and ponds in the two communes are compared in Table 1.

While the project focused on raising production and consumption of fruits and vegetables, it should be noted that fishponds were also being promoted at the same time. There were substantial differences in fish availability in the project commune and the control commune. The average stocks of cattle, pigs and poultry per family were also larger for the project commune than for the control commune.

TABLE 1
Production and utilization of food in the project (Khai Xuan) and control (Ching Cong) communes at baseline and follow-up (g/caput/day)

Food	Khai Xuan		Ching Cong	
	Baseline	Follow-up	Baseline	Follow-up
Vegetables				
Produced	68.2	217.7	64.0	122.6
Sold	3.7	17.3	6.0	18.5
Consumed	64.1	188.8	55.5	86.6
Other	0.4	11.5	2.6	17.6
Fruit				
Produced	36.7	70.6	31.8	43.3
Sold	13.2	43.0	5.2	16.9
Consumed	23.5	27.0	26.6	25.8
Other	0.0	0.7	0	0.7
Meat				
Produced	42.3	21.0	8.6	3.2
Sold	26.6	10.6	5.2	0.1
Consumed	15.6	10.4	1.7	3.1
Other	0.1	0	1.6	0
Fish				
Produced	0.7	23.7	0	0.4
Sold	0.0	6.5	0	0
Consumed	0.7	15.5	0	0.4
Other	0	1.7	0	0

Food and nutrient intake at follow-up

A comparison between the food and nutrient intakes of young children and of the households in the project and control communes at follow-up is shown in Table 2. Children in Khai Xuan were consuming significantly more vegetables and fruit, and energy, protein, vitamin A and iron intakes were higher. Although fat and vitamin C intakes of children were higher in the project commune than in the control commune (5.7 versus 4.9 g and 26.0 versus 18.8 mg, respectively), these differences were not significant. Households in the project commune had

significantly higher intakes of fruit, fat and iron than households in the control commune.

Anthropometric data

In the project commune, the number of children defined as normal increased significantly from the baseline data collection to the follow-up, and the number defined as stunted (low height for age) decreased significantly. There was no significant change in the proportion of children wasted (low weight for height) or both stunted and wasted. In the control commune, there was no change of statistical significance in any of the nutritional classifications between the baseline and follow-up surveys (Table 3). At baseline, there was no significant difference between the two communes in the total prevalence of stunted, wasted, or stunted and wasted children. At follow-up, the difference was statistically significant, with prevalence rates of 49.0 percent in the project commune and 57.2 percent in the control commune.

Mothers' knowledge of nutrition

The mothers' knowledge, attitudes and practices concerning nutrition were assessed. Mothers who had participated in the pilot project nutrition education programme demonstrated a better understanding of good nutrition and of vitamin A than those in the control commune to a highly significant extent.

CONCLUSIONS

In Khai Xuan, the project commune, there were major increases in the food available for consumption or for sale and in food intake. Production and consumption of fruit and vegetables increased as a result of the project. At the time of the follow-up surveys (April 1993), the differences in incidence rates of

TABLE 2
Daily food and nutrient intakes in the project (Khai Xuan) and control (Ching Cong) communes at follow-up survey

Commune	Vegetables (g)	Fruit (g)	Energy (kcal)	Protein (g)	Fat (g)	Vitamin A (retinol equivalents) (µg)	Iron (mg)	Vitamin C (mg)
Children								
Khai Xuan ^a	35.7	44.4	615	17.2	5.7	100	2.6	26.0
Ching Cong ^b	24.1	11.6	490	13.1	4.9	50	1.6	18.8
Significance ^c (t-test)	$p = 0.0142$	$p = 0.0006$	$p < 0.0001$	$p < 0.0001$	ns	$p = 0.0022$	$p < 0.0001$	ns
Household (average per person)								
Khai Xuan ^a	210.0	34.5	1 850	44.0	11.1	260	8.9	49.5
Ching Cong ^b	190.5	4.6	1 960	41.9	8.7	230	5.4	69.3
Significance ^c (t-test)	ns	$p < 0.0001$	ns	ns	$p = 0.0145$	ns	$p < 0.0001$	ns

^a Sample size: 72.

^b Sample size: 99.

^c ns: not significant.

TABLE 3
Comparisons of anthropometric status for the project (Khai Xuan) and control (Ching Cong) communes at baseline and follow-up surveys

Project/collection	Sample size	Normal		Stunted		Wasted		Stunted and wasted	
		%	No.	%	No.	%	No.	%	No.
Khai Xuan									
Baseline	527	42.3	223	50.3	265	3.8	20	3.6	19
Follow-up	465	51.0	237	41.7	194	4.1	19	3.2	15
Significance (χ²)		0.0006		0.0007		ns ^a		ns	
Ching Cong									
Baseline	251	42.6	107	45.8	115	5.2	13	6.4	16
Follow-up	229	42.8	98	47.6	109	4.4	10	5.2	12
Significance (χ²)		ns		ns		ns		ns	

^a ns = not significant.

infectious disease between the project commune and Ching Cong, the control commune, were most significant. Food and nutrient intakes of young children and their nutritional status were significantly higher and mothers' nutritional knowledge (expected to influence positively the care and attention given to their young children) was better in the project commune than in the control commune. While improvements in nutrition may have affected morbidity, the decreasing incidence of infectious disease in the project commune could have contributed to the overall nutritional status as well.

The successful implementation of the community nutrition project focusing on nutrition education and increased household food production appears to have contributed to a significant reduction in the incidence and severity of acute respiratory infection and the incidence of diarrhoeal disease in young children in a rural commune in Viet Nam. These findings emphasize the need for governments, through ministries of agriculture and health, to take long-term measures based on education and household food production to improve nutrition and to reduce infections in young children. ♦

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A community nutrition project in Viet Nam: effects on child morbidity

A nutrition improvement project benefiting 5 588 households with 3 716 young children was implemented in four communes of Viet Nam. The project sought to reduce vitamin A deficiency by raising household garden production, particularly for carotene-rich fruits and vegetables, and by providing nutrition education for mothers of young children. The project collected data to monitor vitamin A status, household garden production, food intake and growth patterns of young children. The project was followed by significant increases in the production of fruits, vegetables and other foods from family gardens; increased intake of nutrients including iron, vitamin C, carotene and protein among households with young children; and improvements in the nutritional status of young children and the nutritional knowledge of mothers.

The data from the nutrition improvement project provided a rare opportunity for monitoring the effects of community nutrition education and family gardening on morbidity in young children. Acute respiratory and diarrhoeal infections are the major causes of mortality in infants and young children in Viet Nam. A morbidity survey showed a highly significant reduction in the incidence and severity of both illnesses in a project commune but no statistically significant change in a control commune in the same district.

Data on household food production, the nutritional knowledge of mothers, dietary intakes of households and the nutritional status of young children were compared to explain the significant differences in morbidity trends between the project and control communes. Children in the project commune consumed significantly more vegetables and fruit and more foods providing energy, protein, vitamin A and iron. In terms of growth, the project commune had witnessed an increase in the number of children defined as normal and a significant decrease in those defined as stunted (low height for age) in the project commune. There was no significant change in the proportion of children wasted (low weight for height) or both stunted and wasted. Mothers who had participated in the pilot nutrition education programme demonstrated a highly significantly better understanding of good nutrition and of vitamin A than those in the control commune. In the project commune there were major increases in food available for consumption or for sale and in food intake.

Projet de nutrition communautaire au Viet Nam: effets sur la morbidité des enfants

Un projet d'amélioration de la nutrition ciblé sur 5 588 ménages (dont 3 716 enfants en bas âge) a été mis en œuvre dans quatre communes du Viet Nam. Le projet visait à réduire la carence en vitamine A en augmentant la production des jardins familiaux, en particulier de fruits et de légumes riches en carotène, et en dispensant une éducation nutritionnelle aux mères. Le projet a rassemblé des données pour suivre l'état des carences en vitamine A, la production des jardins familiaux, les apports alimentaires et les schémas de croissance des enfants en bas âge. Le projet s'est traduit par un fort accroissement de la production de fruits, de légumes et d'autres aliments cultivés dans les potagers; par une augmentation de l'ingestion de substances alimentaires contenant du fer, de la vitamine C, du carotène et des protéines chez les ménages ayant des enfants en bas âge; et par une amélioration de l'état nutritionnel de ces enfants et des connaissances nutritionnelles des mères.

Les données du projet d'amélioration de la nutrition ont offert une rare occasion de suivre les effets de l'éducation nutritionnelle de la communauté et des jardins familiaux sur la morbidité des enfants en bas âge. Les principales causes de mortalité des nourrissons et des enfants en bas âge au Viet Nam sont les infections respiratoires et diarrhéiques aiguës. Une enquête sur la morbidité a fait apparaître une réduction hautement significative de la fréquence et de la gravité de ces deux maladies dans une commune du projet, mais aucun changement sensible du point de vue statistique dans la commune-témoin faisant partie du même district.

Les données sur la production vivrière des ménages, les connaissances des mères en matière de nutrition, les apports alimentaires des ménages et l'état nutritionnel des enfants en bas âge ont été comparés afin d'expliquer les différences importantes des tendances de morbidité entre les deux communes. Les enfants de la commune du projet ont consommé beaucoup plus de fruits et légumes et davantage d'aliments leur fournissant un apport énergétique et protéique, de la vitamine A et du fer. Pour ce qui est de la croissance, la commune du projet a constaté une augmentation du nombre d'enfants définis comme normaux et un recul important des enfants souffrant de retards de croissance (petite taille par rapport à l'âge). Aucun

changement sensible n'a été observé dans la proportion d'enfants souffrant de déperissement (faible poids par rapport à la taille), ou d'enfants souffrant à la fois de retards de croissance et de déperissement. Les mères qui ont participé au programme pilote d'éducation nutritionnelle ont démontré qu'elles avaient des connaissances nettement plus développées sur la nutrition et la vitamine A que celles de la commune-témoin. Dans la commune du projet, il y avait un plus fort accroissement des disponibilités dans les aliments destinés à la consommation ou à la vente, et dans les apports alimentaires.

**Proyecto de
nutrición
comunitaria en
Viet Nam:
su efecto en la
morbilidad
de los niños**

En cuatro municipios de Viet Nam se llevó a cabo un proyecto de mejora de la nutrición que se extendía a 5 588 hogares con 3 716 niños de corta edad. Con el proyecto se trataba de reducir la avitaminosis A elevando la producción hortícola familiar, especialmente de frutas y hortalizas ricas en caroteno e impartiendo educación nutricional a sus madres. El proyecto acopió datos para seguir de cerca la situación en cuanto a vitamina A, la producción hortícola familiar, la ingesta alimentaria y las pautas de crecimiento de los niños de corta edad. De resultados del proyecto, hubo aumentos significativos en la producción de frutas y hortalizas y de otros alimentos procedentes de huertos familiares, un incremento de la ingesta de alimentos, en particular hierro, vitamina C, caroteno y proteínas entre hogares con niños pequeños, y mejoras en el estado nutricional de éstos y en los conocimientos de las madres sobre nutrición.

Los datos recogidos permitieron seguir de cerca la enseñanza nutricional comunitaria y de la horticultura familiar en la morbilidad de los niños de corta edad. Las infecciones respiratorias y las diarreas agudas eran en Viet Nam las causas principales de mortalidad de los lactantes y niños de corta edad. Una encuesta sobre morbilidad mostró una reducción muy significativa de la incidencia y gravedad de ambas enfermedades en un municipio del proyecto pero ningún cambio estadísticamente importante en un municipio testigo.

Para explicar las diferencias notables observadas en las tendencias de la morbilidad entre uno y otro municipio se compararon los datos sobre producción alimentaria familiar, conocimientos nutricionales de las madres, ingestas dietéticas de los hogares y estado nutricional de los niños de corta edad. Los niños del municipio del proyecto consumían muchas más verduras y frutas, así como más alimentos productores de energía, proteínas, vitamina A y hierro. Por lo que respecta al crecimiento, hubo un aumento en el número de niños definidos como de crecimiento retrasado (talla/edad) en el municipio del proyecto. No hubo un cambio notable en la proporción de niños emaciados. Las madres que habían participado en el programa de educación nutricional del proyecto piloto resultaban conocer mejor, en un nivel estadístico muy significativo, lo que era una buena nutrición y la vitamina A que las del municipio testigo. En el municipio del proyecto se registró un gran incremento en los alimentos disponibles para consumo y para venta, así como en la ingesta alimentaria. ♦