

PROGRESS OF VITAMIN A DEFICIENCY CONTROL PROGRAM IN VIETNAM

Ha Huy Khoi¹, Nguyen Cong Khan¹, Tu Giay¹, Nguyen Trong Nhan², Hoang Viet Thang¹, Nguyen Xuan Ninh¹, Nguyen Chi Dung², Nguyen Thu Nhan³, Dao Ngoc Dien³, Hoang Thi Luy⁴.

¹National Institute of Nutrition, ²National Institute of Ophthalmology, ³Institute of Pediatrics, ⁴Eye Center of HCMC.

Abstract

Vitamin A deficiency and xerophthalmia are one of the major nutritional deficiencies in Vietnam. The national prevalence survey conducted in 1985-88 showed that prevalence of severe xerophthalmia (X2/X3) was seven times higher than the cut-off point established by the WHO for public health problem. From the result of this survey, Government of Vietnam has launched a program to control Vitamin A deficiency. This program started in 7 pilot districts in 1988 and gradually expanded to all of the communes in the country in 1993. **To ensure the effective implementation**, an implementation network has been set up from commune to central levels by a strong preventive health structure with the actively participation of mass organizations like Women Union, Education sectors... A comprehensive strategy has been **developed** including nutrition education; Universal distribution of Vitamin A capsules to target children in combination with NIDs and lactating mothers in community; Promotion of production and consumption of Vitamin A-rich foods at household level through family VAC (Gardening- Fish culture - Animal husbandry). The national survey conducted in 1994 showed that prevalence of clinical xerophthalmia is lower than the criteria of the WHO of a significant public health problem in preschool children. Applying appropriate strategies which are closely integrated with primary health care activities, mobilizing successfully community involvement and implementing effectively the monitoring and supervising network are major factors that lead to the current achievement of Vitamin A program in Vietnam. We are ongoing to combine different strategies to maintain the success and further sustainable achievements.

I. Background

Vitamin A deficiency has long been recognized as a serious public health problem in many developing countries and has negative health consequences for children and women. The World Health Organization estimated that every year approximately 10 million children develop xerophthalmia, 250,000 go blind, and between one and three million die because of vitamin A deficiency. There is strong evidence that Vitamin A deficiency increases mortality among children from 6 months to 6 years of age and improving the Vitamin A status of deficient children dramatically increases their chance of survival. Vitamin A deficiency does not only cause blindness, negative growth and development alone, but more importantly, sub-clinical deficiency appears to be a major risk factor for both child and maternal mortality.

Control of Vitamin A deficiency is an important nutrition intervention worldwide. One of the main goals of the World Summit for Children (1990) is the virtual elimination of Vitamin A deficiency and its consequences, including blindness. The World Declaration and Plan of Action for Nutrition of the International Conference on Nutrition (1992) also called for efforts to be made toward eliminating Vitamin A deficiency and xerophthalmia

before the end of 90' decade. September 1995, the Vietnam premier Minister approved the National Plan of Action for Nutrition (1995-2000) which highlighted the goal of eliminating Vitamin A deficiency and xerophthalmia by the year 2000.

In the early 80's, Vietnam attempted to fight against four main nutritional problems including Protein-Energy Malnutrition, Vitamin A deficiency and xerophthalmia, Nutritional anemia and Goiter due to Iodine deficiency disorders. At that time, data from Institute of Ophthalmology showed a very high rate of blindness among admitted xerophthalmic children (40.4%). Health professions viewed Vitamin A deficiency and xerophthalmia serious problem. From 1985 to 1988, the National Institute of Nutrition in collaboration with the National Institute of Ophthalmology conducted a nation-wide survey involving the examination of 34,214 children under 5 in 20 selected provinces. This 1985-88 survey showed the prevalence of severe xerophthalmia was 7 times higher than the cut-off point established by WHO for public health significance. From the result of this survey, and after 2 workshops in HN and HCMC, Government of Vietnam recognized the urgent need to prevent nutritional blindness and vitamin A deficiency, which lead to the establishment of National Vitamin A program. Vitamin A program was implemented in accordance with WHO ten years support program of controlling Vitamin A deficiency and xerophthalmia. Program strategy has been developed including universal distribution of Vitamin A capsules to target children and lactating mothers in community; Nutrition education; Promotion of production and consumption of Vitamin A rich-foods at household level through family V-A-C ecosystem (Gardening - Fish culture - Animal husbandry). Since 1993, program covers every commune in the country and in close integration with EPI program. The achievement of Vitamin A program in Vietnam are due to several main factors which are the appropriate strategies that closely integrated with primary health care activities and the successful social mobilization action as well as the effective monitoring and supervising activities implemented by the preventive health network.

II. Vitamin A deficiency control Program: Formulation and Design

1. Vitamin A deficiency is serious public health problem in Vietnam

Table 1. Clinical assessment of Vitamin A deficiency and xerophthalmia (the first prevalence survey 1985-88, n= 34,214)

Clinical forms	Prevalence (%)	WHO criteria (1981)
Night blindness (XN)	0,37	> 1%
Bitot's spot (X1B)	0,16	> 0,5%
Corneal unceleration/ Keratomalacia X2/X3A/X3B)	0,07	> 0,01%
Corneal scar (XS)	0,12	> 0,05%

Figure. 1. Distribution of active xerophthalmia with corneal lesions and xerophthalmic scar by ecological regions (the first prevalence survey, 1985-88)

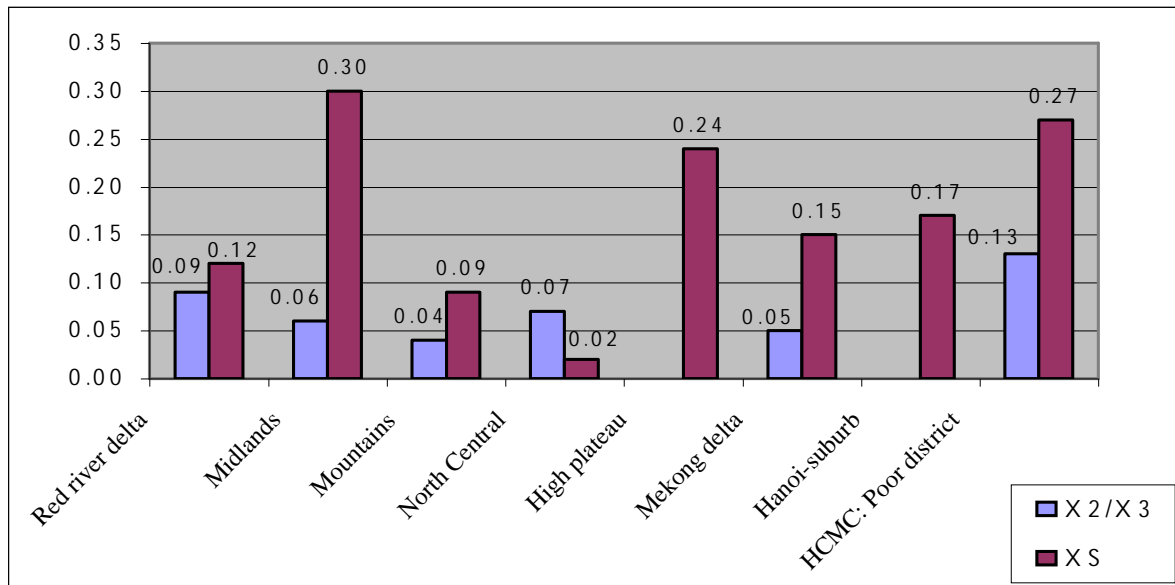


Table 2. Reported cases with xerophthalmia admitted in central hospitals

	At the Institute of Ophthalmology (1979-1983)	At the Institute of Pediatrics (1984-1986)
Number of cases	104	275
Visual impairment (%)	26.9	3.6
Monocular blindness (%)	26.9	8.7
Binocular blindness (%)	13.5	8.0

Clinical Vitamin A deficiency was presented as a serious public health problem in Vietnam with the total prevalence of 0.72 per cent in which prevalence of active forms with corneal lesions of 0.07 per cent and of corneal scar of 0.12 per cent. Xerophthalmia was prevalent in all ecological regions. These figures are much higher than WHO criteria for public health problem. The rate of blindness consequence in hospitalized children was very high which clearly indicated the severe clinical manifestation of vitamin A deficiency and the urgent need for appropriate intervention. From in-depth analysis, it was suggested that the age group with highest prevalence and severe clinical symptoms was age from 12 to 36 months. The dietary Vitamin A intake of children in general was much lower than the recommended requirement. Not just only low vitamin A intake, other nutrient intakes were also low while in many regions, people beliefs of avoiding the use of fat, oil, green vegetable, and animal foods for children were still popular. Inappropriate breast-feeding and weaning practices were the key risk factors for xerophthalmia. Child feeding practices during illness period also played an important role

in developing xerophthalmia. There is a close relationship between severe protein-energy malnutrition and xerophthalmia in children.

2. Formulation of the program

With data from the first prevalence survey and hospitals, 2 workshops on control of vitamin A deficiency and xerophthalmia were held in Hanoi City (1986) and in Ho Chi Minh City (1987). Scientists including nutritionists, ophthalmologist and pediatricians participating in the workshops were all committed to take action to control vitamin A deficiency in Vietnam. The National Institute of Nutrition, Institute of Ophthalmology and Institute of Pediatrics had developed a national program for control of vitamin A deficiency. This program was soon approved by the Ministry of Health as the Government recognized the urgent need to prevent nutritional blindness and vitamin A deficiency in its country. Vitamin A program was then implemented in accordance with WHO Ten Years Support Program for control Vitamin A deficiency and xerophthalmia.

2.1. General Program's objectives:

- Gradually reduce the prevalence of disease, especially active xerophthalmia with corneal lesions leading to blindness and to virtually eliminate xerophthalmia by the year 2000
- To improve dietary intake of vitamin A, carotene, fat of people especially of young children and mothers.
- To spread awareness among health professionals and people in general about Vitamin A deficiency regarding how to prevent vitamin A deficiency and how to detect and manage xerophthalmia.

2.2. Program Strategies

Based on the analysis of the first national survey on Vitamin A, the National Institute of Nutrition has developed comprehensive intervention strategy with intensive involvement of both curative and preventive health systems, from central to grass-root level. The program was implemented in close cooperation with mass-organizations and was successful in motivating and mobilizing people at all levels. The activities included:

- *Universal periodic supplementation of high dose Vitamin A capsules* every six months to children age from 6 months to 5 years (from 1997, vitamin A capsules were targeted to children from 6 to 36 months). Vitamin A distribution program also targets for prophylaxis include high-risk cases such as children suffering from measles, chronic diarrhea, acute respiratory infections and severe malnutrition in hospitals and also in community. Mothers who have given birth within one month are also given a prophylaxis vitamin A dose of 200,000 IU. In the community, Vitamin A distribution was integrated with growth monitoring and with other primary health care activities such as immunization, control of diarrhea, respiratory infections and helminthes. The Vitamin A capsules of 100,000 IU, which are locally produced since 1992 according to the WHO prescribed "GMP" rules.

Table 3. Administration schedule of Vitamin A Capsules (100,000 I.U)

Purpose	Target Group	Dose
Universal distribution for prevention	Infants 6-12 months old	1 capsule once a year
	Children 1-3 years old	2 capsules twice a year
	Lactating women	2 capsules within one month after delivery
Disease-targeted prevention	Children 1-5 years old	2 capsules for each episode of illness
	Infants 6- 12 months	1 capsule for each episode of illness

- *Promotion of food production through family VAC ecosystem* with great emphasis on the use of vitamin A-rich foods.

The VAC stems from Vietnamese that was suggested by Prof. Tu Giay, the founder and the first director of the Vietnam National Institute of Nutrition. It is an acronym for Garden (V); Pond (A) and Cattle shed (C). The VAC has its root in long-established Vietnamese tradition, a tradition originating in agricultural exploitation in the lowland of the Red River delta, where, throughout the history, the Vietnamese grown rice. As regarding to the family food production, the VAC is a highly intensive farming technique that makes optimal use of land, solar energy, and soil nutrients. From the Garden (V), different species of plants are grown in multi-layered cultivation, mixed cropping and inter-cropping cultivation systems, where people can grow vegetables, beans, legumes, roots, tubers and fruits. Close to the garden is the fish pond (A) in which various types of fish, shrimp, crab that feed resources benefit residues from V and C. Animal husbandry (C) with poultry and animal, livestock cultivation can provide meat, eggs, milk...The residues from V, A, C in their return, are to be used to foster the system. One important aspect is VAC involves the women role and that woman can get nutrition benefit from VAC production. In the VAC, it was promoted of growing green vegetables, fruits, eggs, and fish for family consumption. The development of family VAC was done together with nutrition education.

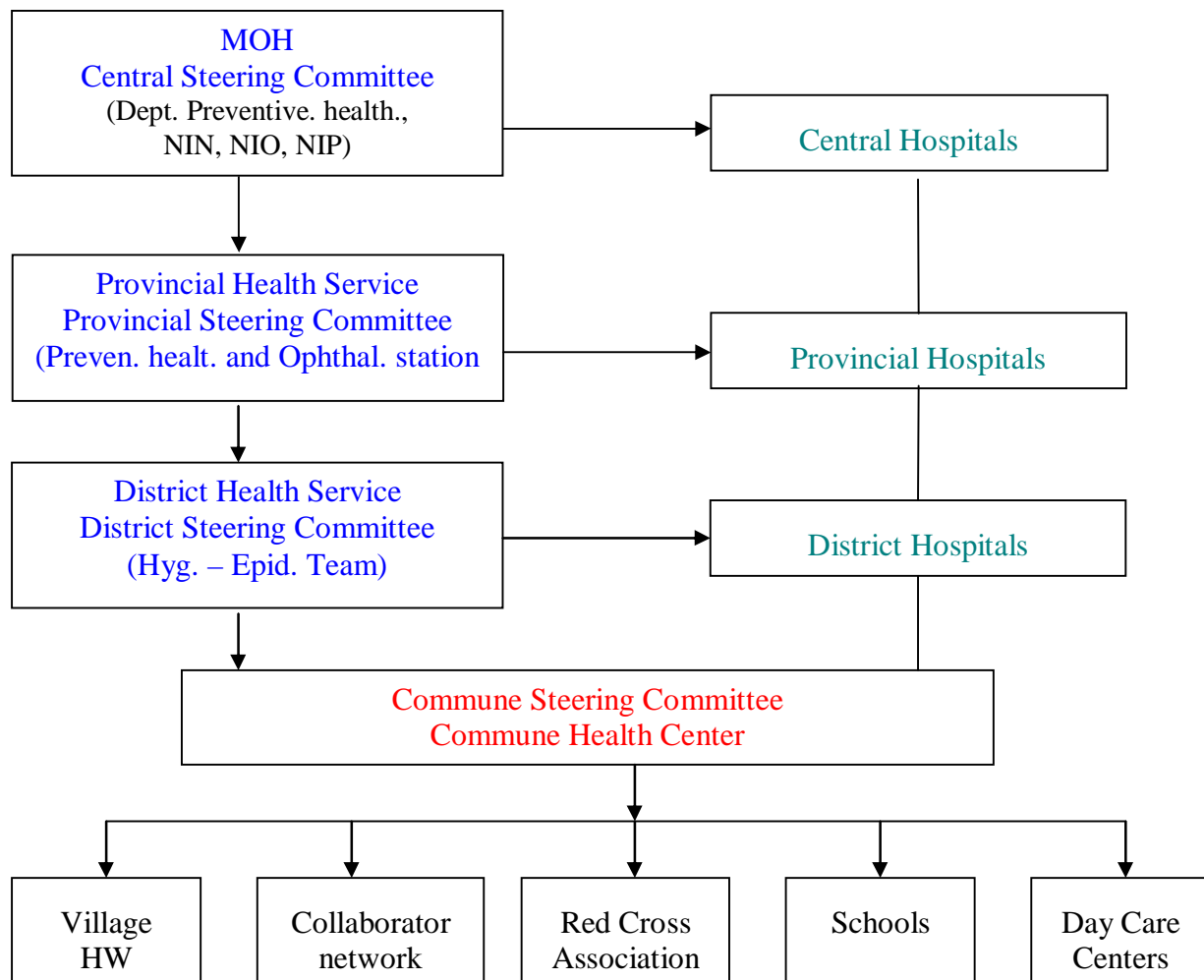
- *Development of nutrition educational activities for community.* Nutrition education aims at spreading awareness among people about vitamin A deficiency and specifically addressing the problem of feeding patterns related to vitamin A deficiency. The following points were highlighted: promotion of breast-feeding, appropriate starting time for weaning; educating mothers to feed the child with vegetables, fruits and fat regularly; improving dietary intake of pregnant and lactating mothers with vitamin A-rich foods,

introduction of locally available vitamin A-rich foods; providing sufficient information to health workers, family members and pupils to help them to be aware of symptom of night blindness for early detection and treatment of xerophthalmia. The nutrition education activities are done through mass education, communication campaigns and regular education. Before and during the vitamin A campaigns, an intensive social mobilization and information campaign is carried out through the mass media, sectoral ministries and health education networks. The main emphasis from 1996 onwards is to provide the whole population general information about all micronutrients (VAD, IDA and IDD) and their impact on health and development, and inform them about the measures the Government is taking to control possible deficiencies (the Micronutrient Days). Specific information is given to mobilize the families to bring children to the distribution points for vitamin A supplementation, weighing and immunization.

- *For further solution*, Food fortification with vitamin A will be considered along with other continuing measures.

2.3. Program network and implementation process

Diagram of Program networking



The National Vitamin A program was under the direct guidance of Department of Preventive Health of Ministry of Health. The National Institute of Nutrition is the permanent member of National Steering Committee and responsible for community prevention activities whereas the Institute of Ophthalmology and Institute of Pediatrics are responsible for treatment system. The Eye Center of Ho Chi Minh City (Dien Bien Phu hospital) is responsible for treatment system in Southern provinces as well as partially providing preventive vitamin A capsules to provincial level. At regional level, regional institutions including Institute of Public Health in Ho Chi Minh City, Pasteur Institute of Nha Trang and High Plateau Institute of Epidemiology and Hygiene, also participated in the program implementation in their own region under the guideline of the central steering committee for vitamin A program.

At provincial and district levels, program was implemented in close cooperation with both preventive and curative systems under the guidance of provincial/district health services. One program secretary who works at provincial center for preventive medicine was appointed in each province. At the community level, commune health center is responsible for this program. The collaborator network including members of women Union, Red Cross Union, Village health workers etc...involved in program implementation at village level. This structure allows Vitamin A activities to be integrated with other health activities effectively and successfully.

With the support of UNICEF, the National Institute of Nutrition has organized various training courses for most health staff who work for the program at provincial or district levels. Retraining/refreshing courses were also given annually or in every two years. In 1990-1992, 8 courses of eight-day on program management were conducted for provincial program steering committee, program secretary and members of mass-organizations, with the assistance of the Vietnam-Netherlands Medical Committee. One of the main materials used in these training courses was the booklet "Control of vitamin A deficiency and xerophthalmia" published in 1988 by Hanoi Medical Publishing House originally with revision in 1991. Training materials were developed and produced by the program include two posters and one videotape. Commune health workers were trained by district or provincial staffs. In total, 286 training courses were organized for 17,101 participants from preventive health system, members of mass organizations from provincial to commune levels. Annually, about one or two months before the Micronutrient Days taken place, the implementation meetings and trainings on management of vitamin A campaign for all provinces were organized.

Training courses for health staff working at provincial hospitals and ophthalmology stations were conducted by the National Institute of Ophthalmology. In the last 12 years, with UNICEF, CBM and Sight First Project supports, 227 training courses for professionals working in pediatric hospitals, ophthalmology stations and health workers working at community. The "primary eye care" booklets and copies of WHO's translated booklets on "vitamin A supplementation" were provided to hospital system in all provinces in the country.

Vitamin A program first implemented in 7 pilot districts of three provinces in 1988. In the following years, 27 more provinces were involved, and in 1990 this number rose to 31, with the total of 156 districts participating. Since 1993 the program expanded to a national scale and closely integrated with National Immunization days. Vietnam organized the National Micro-nutrient Days on the first and second of June every year starting from 1996.

2.4. Monitoring and evaluation

Few days after the vitamin A distribution campaigns, reports in national standard form are sent bottom up, all the way to central level. Reports computed from hospital system were sent to Institute of ophthalmology every 6 months, reporting the prophylaxis activities carried out by hospitals and eye stations. Progress is closely monitored through the established reporting systems and through the post-campaign spot checking mechanisms to validate the reported results. Monitoring activity was carried out not only by central level but also by the regional institutions and provincial/district levels.

With the support of UNICEF, National evaluation was done in 1994 and in 1998 with the technical assistance of international experts.

III. Activities and results

Vitamin A supplementation

With the support of UNICEF, universal distribution of high dose vitamin A capsules was targeted for children age from 6 to 60 months and shifted to focus in children age from 6 to 36 months since 1997. Every-6-month, vitamin A distributions served about 9 millions children under 5 (1993-1996) and about 5 millions children aged from 6 to 36 months (from 1997) in all communes of the country. The first campaign is during the first and the second of June and the second is in integration with National Immunization Days (NIDS) in December.

As showed in figures 2 and 3, the coverage rate of vitamin A supplementation in children manages to remain high from 1993 up to now. What we have learnt from the implementation process is that the integration and the close operational cooperation of vitamin A supplementation and EPI/NIDs programs have proven to be a powerful way to enhance and sustain both programs. Micronutrient Days has been able to have the involvement of several mass-organizations such as women union, Red cross union, education sectors...At each commune, the campaign was organized with actively participation of such mass organizations. One of advantages was the preventive health sector in Vietnam has had experiences in implementing such health promotion campaigns. Thus, the program had moved ahead in the integration process of health care activities based on strengthening implementation capacity of the existing preventive health network.

Figure 2. Coverage of high dose vitamin A distribution based on monitoring data

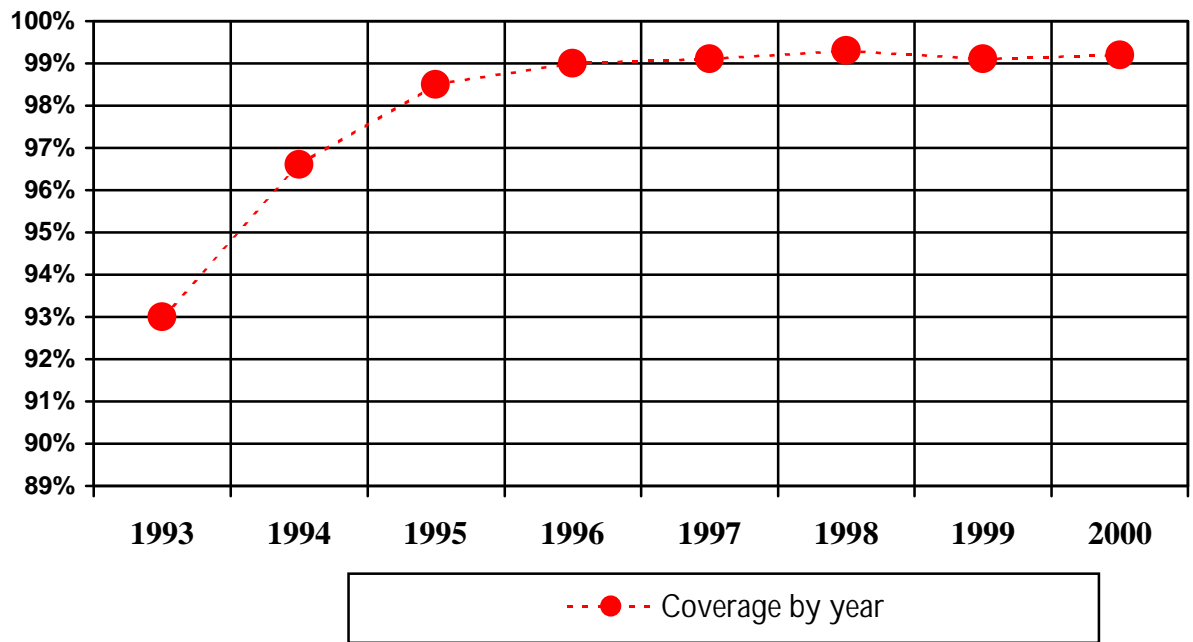
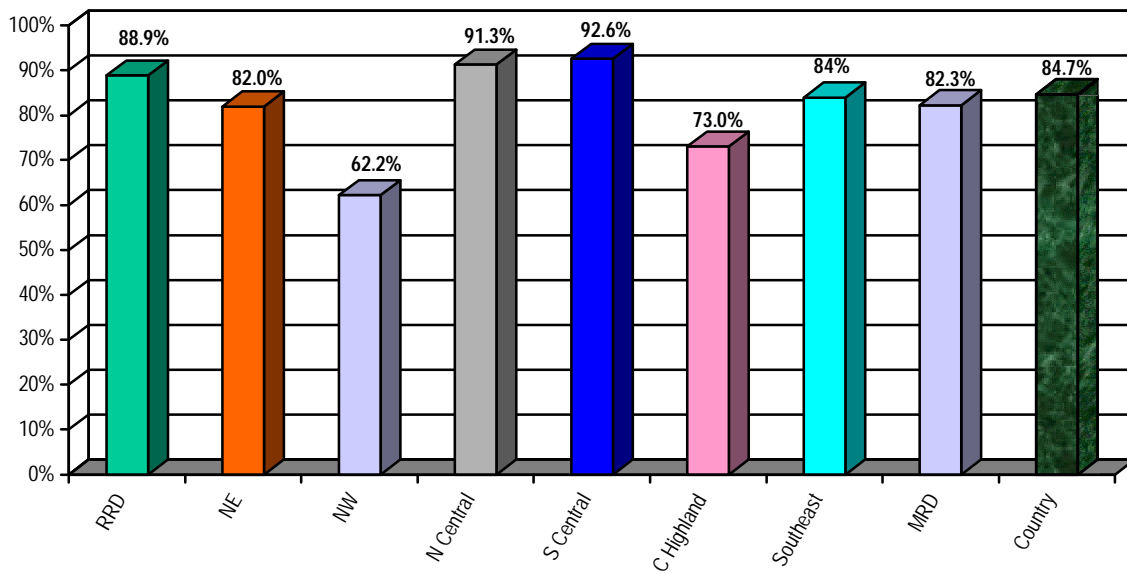


Figure 3. Coverage of vitamin A capsules in 2000 by different ecological regions (Source: General Statistics Office, 2000)



However, the coverage of vitamin A distribution among children in remote and/or difficult areas is lower than other areas. Special attention should be given to improve the coverage of such localities. In addition, the coverage of vitamin A supplementation among mothers after delivery were low during some initial years since capsules are not always available at commune health center. From 1998, program provided vitamin A capsule packed in the blister form, which can be kept at community health center for distributing to the lactating mothers. Thus, the coverage rate of vitamin A capsules among lactating mothers increased from 20% before up to 70% now according to report by routine monitoring system.

Promotion of food production through the family VAC ecosystem.

Promotion of dietary diversification to ensure the availability of micronutrients and other nutrients is the long term and sustainable solution to solve problem of vitamin A deficiency as well as other nutritional deficiencies. In Vietnam, special attention has been given to the promoting of family food production through the VAC ecosystem (Gardening- Fishculture-Animal husbandry) and became the Government policy in improving people diet and nutritional status. Like other nutritional deficiencies, vitamin A deficiency is a consequence in poor intake of not only vitamin A, but also of other nutrients, mainly energy, protein and fat. Thus, vitamin A control program should be considered as one of the key components of the general program for controlling nutritional deficiencies and improving people's dietary intake.

Experiences from VAC movement in Vietnam showed that VAC production by family can contribute between 50 to 70 per cent of family income and even much higher in the well-developed VAC. In order to promote nutritional benefits from VAC, the National Institute of Nutrition and Vietnamese VAC association have encouraged people to establish a "nutrition square" with a special emphasis on the food production for family consumption such as vegetables, eggs, fruits. This was combined with nutrition education oriented activities referring production and consumption vitamin A-rich foods including dark green leafy vegetables, fruits, papaya, momordica. The results from several projects on the promotion of VAC and nutrition education have showed the benefit in improving vitamin A nutritional status of children and women (Nutrition improvement project, FAO supported 1991, 1993; Household food security for nutrition improvement, FAO supported 1997-2000; other household food security projects, UNICEF supported).

Together with vitamin A supplementation, the promotion of VAC in Vietnam has contributed to the prevention of vitamin A deficiency. The 1994 Survey showed that even non-vitamin A recipient group, the severe clinical forms of xerophthalmia no longer exists (see table 4). Improvement of dietary intake of vitamin A and other nutrients has an important contribution to the prevention of vitamin A deficiency in Vietnam during the past ten years.

Nutrition education and communication activities for community

Nutrition education is the key component of vitamin A and nutrition programs in Vietnam. During Micronutrient Days and NIDs, the mass propaganda with multi-channel communication is organized. Posters, booklets and nutrition newsletter are provided to all communes. With great support from the Government within framework of National Plan of Action for Nutrition (1995-2000), these activities have been focussed at community level and expanded to different target audiences. Several activities have been well organized including child rearing competition, competition of preparation a proper family meal. These activities are actively participated by women union, school teachers and other members of mass organizations in the community level. Nutrition education and social mobilization have the positive influence on attitude and practice of different groups concerning micronutrient deficiency control, including community leaders at all levels which in turn, contribute greatly to the success of vitamin A supplementation program.

IV. Program impact

The 1994 and the 1998 surveys showed that prevalence of clinical xerophthalmia is lower than the WHO of a significant public health problem in preschool and significantly lower than those identified has the baseline survey (1985-88). None of the ecological zone in Vietnam does the prevalence of active cases of xerophthalmia (X3A-X3B) exceeding any of the WHO cut-off points. In hospitals, number of cases with nutritional blindness has dramatically reduced. In the past, it was estimated that every year about 5,000 children under five years of age went blind due to xerophthalmia. This shows a great contribution of the program to the health and social benefits in Vietnam.

The prevalence of nightblindness among vitamin A capsule non-recipients is similar to the prevalence noted during the Baseline survey (1985-88), which indicates the effectiveness of the vitamin A capsule program. The prevalence of maternal nightblindness is 0.58% in 1994 Survey and 0.90% in 1998 Survey. The survey pointed out that low vitamin A intake is associated with maternal nightblindness. Mothers with low intake of vitamin A are particularly at risk when they are pregnant.

The prevalence of subclinical vitamin A deficiency (serum concentration of retinol $< 0.70 \mu\text{mol/L}$) in children under 5 is 10.8%. In the survey sample, no case of very low serum retinol ($< 0.35 \mu\text{mol/L}$) was detected. The subclinical vitamin A deficiency was found to be higher in children below one year of age (figure 5). Prevalence of lactating women with low breastmilk retinol concentration ($< 1.05 \mu\text{mol/L}$) is 58.3% in the 1998 survey in accordance with an increased prevalence of nightblindness as compare to the figure 1995 and 1997 (figure 6).

Improving maternal vitamin A status should be emphasized in future program with combined both effective vitamin A supplements in postpartum period and dietary improvement. Special attention should be given to poor areas with low rate of mothers giving birth at health institutions.

Table. 4. Clinical Assessment of Vitamin A Deficiency in Vietnam (prevalence, %)

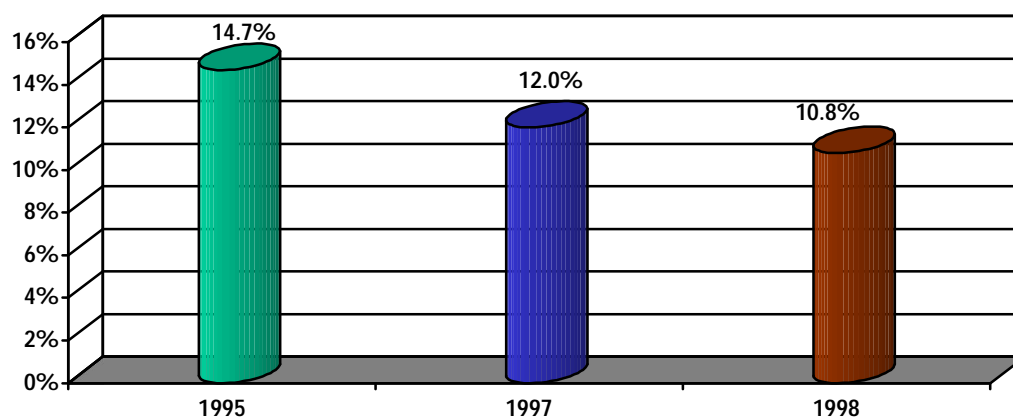
Clinical sign	1988*	1994**		1998***
	<i>Total sample</i>	<i>Non-VAC recipients</i>	<i>Total sample</i>	Total sample 12,900
	34,214	2,953	37,920	
Night-blindness(XN)				
Children under 5 years	0.37	0.37	0.05	0.20
Pregnant/ Lactating Mothers	-	-	0.58	0.90
Bitot's Spots(X1B)	0.16	0.23	0.045	-
X2/X3A/X3B	0.07	-	0.005	-
Corneal scars	0.12	-	0.048	-

* *National Survey on Vitamin A deficiency, NIN 1988*

** *National VAD/PEM Survey 1994, NIN/HKI/UNICEF*

*** *National PEM/VAD Survey 1998. NIN/UNICEF*

Figure 4. Percentage of Children with Low Serum Retinol Level



Data 1995 and 1997: a small sample survey
Data 1998: National PEM/VAD survey

Figure 5. Low serum retinol prevalence in children under 5 by age groups (1998 Survey)

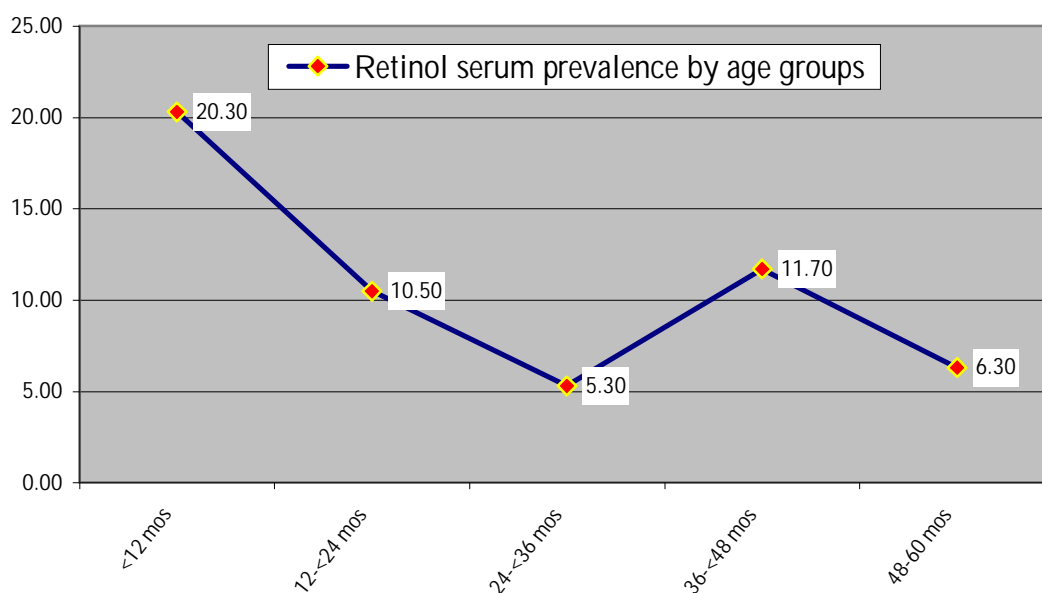
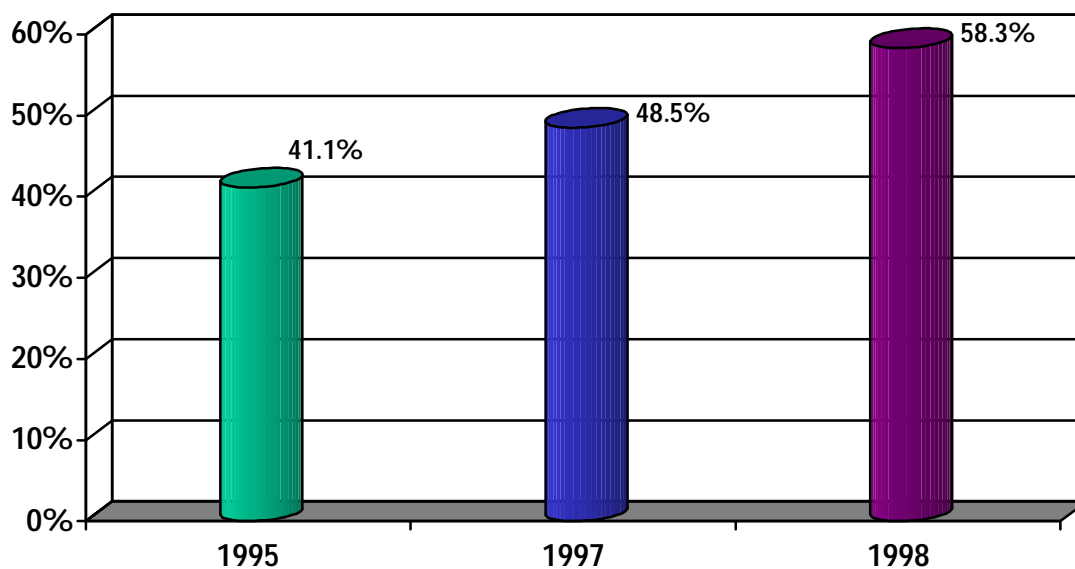


Figure 6. Percentage of Lactating Mothers with Low Breast-milk Retinol Level



Along with socio-economic development in the country, the promotion of VAC had significantly improved of dietary intake by people especially those living in rural areas. The fat intake increased from 8.4% of the total energy intake in the 80's to 15.4 % in the 90's while vitamin A intake of people increased by 2 times. Besides nutritional benefit, VAC ecosystem adopted by many families in different ecological regions has shown a significant contribution to the family income. The pilot study done in some rural communes in Red river delta area showed that family income from VAC production is 3.3 time higher than before.

Nutrition education had a positive influence on changing the child feeding practices. The recent data collected from the Breastfeeding Promotion Project showed that the rates of early initiation of breastfeeding was 59% and exclusive breastfeeding for 4 months was 31.1% which significantly improved in comparison with the figures before. Most of mothers in rural area now know better how to prepare proper weaning food for young children with practice of adding more fat, vegetables and animal foods.

The health workers of all communes can manage well with early detection, treatment and prevention of vitamin A deficiency while people in general, also know better how they should do to prevent vitamin A deficiency in children.

Malnutrition among under 5 children reduced from 51.5% in 1985 to 33.8% in 2000 in which prevalence of very severe form of malnutrition reduced from 1.6% to 0.5%. Reduction of child malnutrition prevalence also contributed to the reduction of vitamin A deficiency and xerophthalmia in Vietnam. National child malnutrition control program started from 1996 and implemented by Committee for Protection and Care for Children. From 1998 this program shifted to Ministry of Health and implemented by the National Institute of Nutrition. This is an advantage to combine all efforts toward improving maternal and child nutritional status in our country.

V. Conclusion

The achievement of vitamin A program in Vietnam in the last decade has proved the careful process from situation analysis to the formulation of plan of actions. We have achieved the goal of virtually elimination of Vitamin A deficiency and xerophthalmia by the year 2000. The universal vitamin A supplementation to children has been maintaining at the high coverage rate. This has been achieved through the strong implementation structure based on preventive health network. The program was actively participated by women union, school teachers and other members of mass organizations in the community level. Linking of the vitamin A program with the National Immunization Days (NIDs) is a good approach and we can make use of this system. This is positive development, indicating that vitamin A program has closely integration with the health care services and effective social mobilization.

There is a close cooperation between three institutions at the central level: the National Institute of Nutrition, the National Institute of Ophthalmology and the Institute of pediatrics. The close cooperation between preventive and curative system in health network is also a key point to successful the community program. Not only supplementation program, dietary improvement activity through the promotion of VAC, is considered as the key element of improving vitamin A nutritional status of people. Government at all levels was highly committed to the program. Furthermore, the program has received a great support from international agencies and contributed by all communes in the country.

In the years to come, program will continue the combining measures to achieve a sustainable improvement of vitamin A nutritional status of both children and women. Supplementation program should continue since child malnutrition prevalence in the country is still high. Together with promotion of dietary diversification, food fortification program will begin soon and, is considered as an important strategy in the future program.

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