**Vitamin A Prophylaxis and Anemia Control Programs: Ground Realities at Community Level in Tamil Nadu**

**Thomas V. Chacko, Y.S. Sivan**

PSG Institute of Medical Sciences & Research, Coimbatore, India

Correspondence: Thomas V. Chacko, Professor & Head, Department of Community Medicine & Medical Education, PSG Institute of Medical Sciences & Research, Avinashi Road, Peelamedu, Coimbatore 641 004, India

Email: drthomasvchacko@gmail.com

**Introduction**

“Nutrition is increasingly being recognized as an important indicator of development at national and international levels. Nutritional well-being of the population is considered an economic asset and a pre-requisite for national development.”¹ Micronutrient malnutrition continues to be a major public health problem, especially across developing regions. Both vitamin A deficiency (VAD) and iron deficiency anemia (IDA) are among the “top 10” risk factors contributing to the global burden of disease.² The WHO estimates that 1.4% of all deaths worldwide (0.8 million) are due to VAD. Of the 200,000 underfive deaths due to VAD, most occur in children with mild to moderate VAD. Iron deficiency causes at least 50% of all anemia, and almost a million deaths a year.³

In India, the consumption of all nutrients continues to be below the recommended dietary allowance.⁴ Furthermore, among lactating women on the Indian subcontinent and in South-East Asia, signs of poor vitamin A status (night blindness) are reported, and low breast milk retinol values are found among Indian and Indonesian women.⁵ Misconceptions arising out of faulty beliefs (socio-cultural factors), such as not giving colostrum to the newborn assuming that it would be harmful to the child, continues to be a major impediment.

The National Prophylaxis Programme for Prevention of Blindness due to Vitamin A Deficiency and the National Nutritional Anemia Control Programme (NNACP) have been in force since 1970.⁶,⁷
However, VAD and IDA among the population at risk continues to be a problem of public health significance. The prevalence of VAD has remained constant (0.7–1.1% during the period 1988–2003) among preschool-age children.8 The prevalence of anemia among women aged 15–49 years is about 55%.9 These programs are being implemented by the Department of Family Welfare of the Ministry of Health and Family Welfare (MoHW), Government of India, through the network of Primary Health Centres (PHCs), Health Sub-Centres (HSCs). These centers also actively involve the Integrated Child Development Services-Anganwadi Centres (ICDS-AWCs), which are mother-and-child care centres administered by the Ministry of Women and Child Development (MWCD) in the delivery of the services. Older children not covered under these programs are given therapeutic dosages upon detection of deficiency under the School Health Programme (SHP).

A study on the coverage of nutritional supplementation programs reveals that much more needs to be done. It shows, in Tamil Nadu, that the percentage of children aged 12–35 months who received a vitamin A dose in the previous six months was 37.2%, and only 43.2% of mothers consumed iron and folate (IFA) supplements for 90 days or more when they were pregnant with their last child.9 India’s 10th Five-Year Plan (2002-2007) emphasized intensifying nutrition and health education to improve infant and young child feeding and caring practices so as to reduce the prevalence of anemia by 25%, and moderate and severe anemia by 50%, and eliminate VAD as a public health problem.1 However, these goals were not met, and there has been an increase in the prevalence of anemia, according to data from the National Family Health Survey (NFHS)-2, though the percentage of those who are in the ‘severe’ category has come down.

### Rationale for the study

In Tamil Nadu, the intake of vitamin A and iron is low while the prevalence of clinical VAD (Bitot’s spots) across all age groups is 0.5% – among school-age (> 5–15 years old) children, prevalence is 2.5% (children of school age are not covered under the massive dose administration programme), and among pre-school children and adolescents, it is

### Table 1: Overview of the National Prophylaxis Programme for the Prevention of Blindness due to vitamin A deficiency: Implementation in India and Tamil Nadu (TN)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Target group</th>
<th>Vitamin A solution in pre-calibrated measuring scoop (spoon)a</th>
<th>Recommended dosage</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Children</td>
<td>TN: A total of 10 doses according to the age group to which the child belongs (see description below)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>India: Preference given to 9–36 month Tamil Nadu: 6–60 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children 6 up to 12 months</td>
<td>1 mL (1/2 spoon; 100,000 IU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children 12–60 months</td>
<td>2 mL (1 full spoon; 200,000 IU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Post Natal (PN) Women</td>
<td>2 mL (200,000 IU)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|   |   |   |   |

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*a* White-colored plastic spoon (spoon/measure) in which one embossed circle indicating 1/2 mL is marked; full spoon indicates 1 mL measure. This spoon is supplied with the vitamin A syrup (glass) bottle packed in thin paper card carton. This supply is universal in India. UNICEF has been supplying this, but with the advent of the NRHM, effective 2008, the Government of India began sourcing it on its own. To avoid a state of contingency, the UNICEF continues to be in the picture until Government procurement is secure.

*b* Timing is flexible, e.g., January and June, February and July, etc. However, the six-month interval is maintained at all places.

*c* Age at the time of administration is not exact but approximate, as the criterion is to enumerate (and administer the solution to) the children during the purpose-defined, once-in-six months visit of the health worker team to the habitations, i.e., those who are a little younger than six months and a little older than that age are also administered the dosage meant for children aged 6 months.
0.8% and 3.1% respectively; coverage of these programs remain poor.\textsuperscript{8} This calls for a closer look at the supply chain in the state as well as the reach and efficiency of the implementation of the supplementation programs at the community level in order to develop strategies to improve the utilization of these services by the at-risk populations.

**Objectives of the study**

The goal of the study was to prepare a status paper on the reach and efficiency of the national prophylaxis program on VAD and the national anemia control program with regard to the target groups identified by the Department of Community Medicine so that a comprehensive local initiative can be started.

The specific objectives of the study were:

1. To assess the reach of the vitamin A and IFA supplements in the study area through the health care workers and to study its impact through clinical examination; and

2. to assess the efficiency of the delivery system of the program in terms of grass-roots level workers’ awareness about the national program, their knowledge about the age groups of target groups and corresponding dosages, and the frequency of distribution of these nutritional supplements.

**Methodology and data sources**

Primary data collected through site visits from users and providers by conducting In-Depth Interviews (IDI), Focus Group Discussions (FGD), community survey and clinical examination. Secondary data sources included School Health records and key documents published by the Government of India and Government of Tamil Nadu.

**Table 2: Dosage schedule for the National Nutritional Anemia Control Programme (NNACP, 1991)**

<table>
<thead>
<tr>
<th>SI. No.</th>
<th>Target group</th>
<th>Recommended dosage</th>
<th>When/How long?</th>
</tr>
</thead>
</table>
| I       | Pregnant (ante natal) women | **Prophylactic:** One adult tablet (containing 60 mg/100 mg of elemental iron and 500 µg folic acid)  
**TN:** Prophylactic: One tablet per day (30-30-40)\textsuperscript{a}  
**Therapeutic:** One adult tablet (content as above)  
**TN:** Therapeutic: Two tablets per day (60-60-80)\textsuperscript{a} | Per day for 100 days; these tablets should be provided to women after the first trimester of pregnancy  
**TN:** For 100 days in a year  
Thrice daily for a minimum of 100 days; (in case of 100 mg elemental folifer tablets, recommended dosage is two adult tablets of iron daily for a minimum of 100 days  
**TN:** For 100 days; if Hb level is below normal level |
| II      | Lactating (post natal) women and IUD acceptors | One adult tablet (content as above) | Per day for 100 days |
| III     | Adolescent girls (aged 11–19 years) (component introduced by Tamil Nadu) | One tablet every Thursday | Every Thursday (for 52 weeks in a year) during the period of adolescence |
| IV      | Preschool children (1–5 years) | One pediatric tablet containing 20 mg iron and 100 µg folic acid | Daily for 100 days every year  
**TN:** short supply |

\textsuperscript{a} The VHNs quote the dosage in this fashion: 30-30-40 for prophylactic and 60-60-80 for therapeutic. This indirectly indicates the number of tablets they give at a time to the clients.
The reach of the program was assessed through:

a) Qualitative data on providers’ perspective on the reach of the programs by conducting IDIs with officers, grassroots-level health workers and workers of ancillary institutions such as the ICDS-AWCs. Information given in Tables 1 and 2 were used as standard for comparison of the results obtained. The contents of these tables were gathered from various official documents as well as triangulated from various sources, including the grassroots level workers and program officers;

b) qualitative data on users’ perspectives on the reach of the programs by conducting FGDs and interviews with target groups (or their mothers) as well as members of the community; and

c) secondary data obtained from school health records regarding the administration of vitamin A and iron supplements.

The efficiency of the system of delivery was assessed by carrying out IDIs with grass-roots level workers on their awareness about:

a) the national programme; and

b) the age groups of the target groups, and corresponding dosages and frequency of distribution of the nutritional supplements.

The study area and sample size

A total of nine village health nurses (VHNs), four ICDS-AWWs, one ICDS Supervisor, 12 individuals from the community, and six women’s self-help groups (WSHGs) were engaged in an interview or and FGD; 80 individuals were screened for VAD and IDA, and 18 schools were visited to obtain information from school health records. Interviews, community surveys and clinical examination were conducted, and school health records were studied in the districts of Madukkarai, Palladam, Sarkar Sama Kulam, Sultanpet, Sulur and Thondamuthur.

Ethical considerations

Confidentiality of data source is maintained by not revealing the individual identity of the respondents as well as the service delivery institution-wise performance.

Results and discussion

The results are presented and discussed in two major orientations: (i) reach of the program and (ii) efficiency of the system of delivery of the national vitamin A prophylaxis and anemia control programs. This is done both from providers’ and clients’ perspectives.

The information given in Tables 1 and 2 was used as the standard for comparison of the results obtained.

Reach of the program

The state’s supply chain system

In order to understand the implementation of the program, understanding its supply chain system is important. The central procurement agency of the state of Tamil Nadu sources directly from the manufacturer, and then passes the supplies on through the Tamil Nadu Directorate of Public Health to the district, block and village level staff. The final link in the supply chain is the HSC managed by a VHN and, from them, to the ICDS-AWCs. The indent for supplies is made by the medical officer of the PHC on the basis of an estimation of the size of the target group population. The program is implemented by the PHCs and its HSCs, under the supervision of the medical officers. VHNs administer the vitamin A solution and IFA tablets to the target groups. The ICDS-AWCs provide an opportunity to distribute these supplements to the target groups. In places where ICDS is functioning, the Anganwadi workers are expected to participate not only in the identification of children but
also assist in the administration of vitamin A and in imparting nutrition education.6

As per the statements obtained from the VHNs and AWWs, there seem to be no disruption in the supply of vitamin A solution in these areas. Every month, the VHN of the HSC prepares a (hand-drawn and written) table/consolidated statement using a template. Reach, in terms of physical accessibility, does not seem to be a problem, at least theoretically, as most of the places are connected by public transport. On the whole, Coimbatore district is considered a ‘better performing’ district at the all-India level. Among the 593 districts studied across India, Coimbatore district has an overall ranking of 22 in the country, based on the (i) percentage of women having three or more children, (ii) contraceptive prevalence rate, (iii) underfive mortality rate, and (iv) women receiving three or more antenatal care (ANC) visits.10 The ANC visits are usually the occasion for, among other things, distributing IFA tablets.

Reach of the Vitamin A Prophylaxis Programme

The administration of vitamin A solution is carried out by the VHNs of HSCs either directly or in association with, or through, the AWWs of ICDS-AWCs. As per the verbal statements obtained from the VHNs, this is being carried out regularly. First, an announcement is made in the village regarding the date of administration. Those who do not turn up on the day of administration are covered through a house-to-house visit. For PN women, the solution is distributed during the routine visits. For example, on Wednesdays, which are immunization days, the vitamin A solution is distributed at the HSC, ICDS-AWC or at a place of mutual convenience. Children above five years of age who are not covered under the national vitamin A prophylaxis program are covered under the SHP (discussed under separate heading).

Providers’ perspectives on reach

In-depth interviews were conducted with service providers (VHNs and ICDS-AWWs) to assess the extent of their knowledge about the name, target groups and corresponding dosages and dosage schedule of the programs, and about the reach of the program with respect to the community.

Reach of the Anemia Control Programme

The administration of vitamin A solution is carried out by the VHNs of HSCs either directly or in association with, or through, the AWWs of ICDS-AWCs. As per the verbal statements obtained from the VHNs, this is being carried out regularly. First, an announcement is made in the village regarding the date of administration. Those who do not turn up on the day of administration are covered through a house-to-house visit. For PN women, the solution is distributed during the routine visits. For example, on Wednesdays, which are immunization days, the vitamin A solution is distributed at the HSC, ICDS-AWC or at a place of mutual convenience. Children above five years of age who are not covered under the national vitamin A prophylaxis program are covered under the SHP (discussed under separate heading).

Reach of the Anemia Control Programme in terms of consumption of IFA tablets: According to the VHNs, IFA tablets are supplied in adequate numbers but not all the beneficiaries consume the tablets. A study carried out in the state of Karnataka showed that only about 59% of the women consumed all IFA tablets given to them, and that 25% of the beneficiaries consumed half of the dose while about 8% did not consume any of the tablets and another 8% did not get the tablets. Our study results are similar to that of the Karnataka study. There could be many reasons for non-consumption. One of the respondents told us that her mother-in-law restrained her from consuming IFA tablets saying that it might result in miscarriage or abortion. Hence, besides health education directed toward such opinion makers in the family, roping in other systems of medicine could be a viable alternative, as elders in the village are likely to depend on other systems of medicine other than allopathic. In this context, it is heartening to note that the Tamil Nadu government has already supplied kits containing Indian Systems of Medicine (ISM) drugs to selected VHNs. A pilot program with ISM drugs for reducing anemia is being started in two blocks of Thiruvannamalai district.12

Lack of motivation among the health workers leading to inadequate follow-up visits, shortage of tablets, high workload of health workers, side effects of the supplements, and other issues could be the reasons behind the lack of receipt of tablets and its resultant non-consumption. Those who distribute tablets (VHNs, ICDS-AWWs, etc.,) must be trained to...
give need-based health education to the target groups to ensure improved acceptability and consumption of the IFA. In addition to these factors, NFHS results also indicate that literacy improves consumption rate.\(^9\)

Users’ perspectives on reach

Awareness about the Vitamin A Prophylaxis Programme and National Nutritional Anemia Control Programme among women’s groups: These groups represent potential allies in the community for implementing the program and so it is important to know their awareness about the services provided under these programs. Through FGDs, we found that members of the WSHGs are aware of the Vitamin A Prophylaxis Programme and NNACP, though not by its name. The vitamin A solution being administered has been known to them as “meen ennai” in their vernacular, meaning fish oil, and IFA tablets as “irumbu chathu mathirai” (iron-essence tablet). It is to be noted here that most of the WSHG members told us that their level of awareness, skills and living standards as a whole have gone up after they became members of the group. They seem to have recognized the program with less difficulty compared to non-member women in the community. This has to be read in the light of the statement that, under the guise of tradition, women in Southeast Asia are oppressed.\(^{13}\) Hence, when they are empowered, they gain social and/or economic independence and therefore gain decision making authority in the family.

Awareness about the vitamin A prophylaxis programme and National Nutritional Anemia Control Programme among individual adult women and adolescent girls in the household in Village A: Individual adult women belonging to the target groups and adolescent girls in the community said that they were not receiving IFA tablets from the VHN. Some of them complained that the VHN had not been seen in their area. Nevertheless, they were getting IFA tablets from secondary or tertiary-level health care institutions, such as the general hospital. This perceived lack of visibility of VHNs has to be considered with our observation that most of the families in this area belong to the middle income group, with most of the heads of households being employed in the public sector. Hence, it is likely that the VHNs, being aware of the higher socio-economic status of this population group, assumed that the target groups in this area are not in need of supplements from them and therefore did not cover such areas as intensively as others.

In the present study, the rural areas are more well-connected than the poorly performing states in the country and accessibility to health care institutions is good in Village A.

Reach as determined by a community survey and clinical examination

Two sample surveys were conducted among the target age groups to ascertain the reach of nutritional supplements in the community. The presence of deficiency symptoms was considered an indicator of relative lack of reach. The surveys were conducted in two villages, i.e. Village A, an area accessible to health care facilities, and Village B, an area not easily accessible to health care facilities.

Service delivery in Village A: Twenty-five members of the community were interviewed and clinically examined. None of the target beneficiary groups received any service from the VHN. Some of the AN and PN women reported that the VHN had not been seen in the area at all. This statement by the community is intriguing, as the vitamin A solution is distributed and administered to children and PN women at all levels of the society. The reason could be that the mothers of the children were not aware that the vitamin A solution was being administered to their children or not. Another possible reason could be that the provider had not explained about the program and/or purpose of administering the solution to the beneficiary mother, nor was the client aware as to what was being administered and its purpose. Another reason could be ineffective and informal ‘outsourcing’ of the task of distribution of supplements to others by the VHNs.

Service delivery in Village B: Sixty-five members of the community were interviewed and clinically examined. Some reported receiving the nutritional supplements, especially vitamin A drops, but it was not clear whether they received IFA tablets or not. This is because they were not able to precisely explain which tablets they consumed.
In both the areas, the respondents or parents of beneficiary groups were not able to tell precisely whether they were getting IFA tablets or not. Since these are dispensed with more than one type of tablets, the recipients are unable to distinguish between the tablets provided. None but a few respondents were able to identify IFA tablets correctly. Since it is a question of awareness about the identity of IFA tablets, it is not possible to conclude whether they are getting IFA tablets or not. However, the health care staff reported the presence of clinical symptoms of deficiency.

No cases of VAD were detected among the target age groups in the villages, except one case of conjunctival xerosis in Village A. However, this could be attributed to the small sample size of the surveyed target group. This needs to be interpreted in the light of the 0.5% prevalence of VAD (X1B) in Tamil Nadu, as per the NNMB Surveys. Anemia was found to be less prevalent in Village A. None of the AN women examined were found to be anemic. In Village B, the prevalence of anemia was found to be higher across all target age groups. In the study population, among adolescent girls, the percentage prevalence of IDA is less than what was brought out by the NNMB surveys for Tamil Nadu. This could be considered an indicator of the better reach of the iron supplements and/or improved nutritional food habits of the population surveyed. The district as a whole could be considered to be better performing, based on its national-level ranking. Nevertheless, there is no room for complacency, as the all-India figure from NFHS-3 shows an increase during 2005–06 in the prevalence of all classifications of anemia pooled over the 1998–99 figures.

Social factors influencing reach

Some of the respondents who were AN or PN women did not consume the tablets given to them on the advise of elders, mostly their mother or mother-in-law. The misconception was that consumption of IFA tablet would result in an abortion. Such misconceptions or beliefs pose a threat to the utilization of the programs’ services and need to be countered by health education among opinion makers of the target groups.

Similarly, many mothers were not aware of massive dose vitamin A supplementation. They often confuse it with the oral polio drops. This could be due to the fact that the vitamin A solution is dispensed almost always on Wednesdays, which are the immunization days, as this ensures better coverage. Apart from the vitamin A solution, other oral drops are given, and this could pose a problem for the rather under-educated mothers in recognizing what is being given and the purpose. The mothers come with the immunization or child growth card but do not seem to know what will be given for what purpose, nor do they have the awareness to demand a particular service. When told about the bottle and white spoon and the local names for the vitamin A solution, some of them were able to recognize it. The VHNs maintain a record for the vitamin A solution distributed and, if the child growth card is brought at the time of administration, it is entered in the card. But if card is not brought by the parent or caregiver, it is not entered. Nevertheless, the vitamin A solution is not in short supply and most of the villages are covered by the ICDS-AWW and/or the VHNs visit these places to supply the supplements. Therefore, it may be deduced that the solution reaches a fairly good proportion of the population.

Reach (service delivery) through the School Health Programme (SHP)

Children above five years of age are not covered under the national vitamin A prophylaxis program, but are covered under the SHP in Tamil Nadu. This is carried out

### Table 3: Observations from school health records of schools in the study area

<table>
<thead>
<tr>
<th>Type of micro-nutrient deficiency</th>
<th>Number of cases detected and supplements given</th>
<th>Number of cases detected, but supplement not given</th>
<th>Case not detected, but supplement given</th>
<th>Total number of students in the school roll</th>
<th>Students examined by doctors for deficiency symptoms</th>
<th>Students not examined by doctors for deficiency symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAD</td>
<td>125</td>
<td>44</td>
<td>3</td>
<td>3204</td>
<td>3042</td>
<td>162</td>
</tr>
<tr>
<td>IDA</td>
<td>112</td>
<td>19</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Neither School Health Card nor any other form of record available in the school for these pupils
when the health care team visits schools routinely twice in a year. Two teachers in each school co-ordinate and assist in the implementation of the scheme, nominating students studying in higher classes as ‘Health Guides.’ All children are screened for vitamin A deficiency and cases that are detected are given the vitamin A solution or are referred to the nearest PHC. Examination of the school health records confirms that the medical team indeed visits the schools twice a year. However, in some schools, we could not find records for higher-level students.

The figures in Table 3 indicate that a substantial number of those who are diagnosed for deficiency of the nutrient(s) are provided with nutritional supplements at the school itself by the visiting School Health team. The observation that there are those who are diagnosed but not administered supplements could be due to a shortage of supplies. It is likely that these children are referred to the nearest PHC.

**Efficiency of the delivery system**

**Awareness among providers about the programs**

As far as the administration of the vitamin A solution is concerned, some of the service providers were not aware of the name of the national program and, more importantly, there was ambiguity in their understanding about the age limit of the target groups, which has a bearing on the reach of the program. Some of the VHNs and ICDS-AWWs seemed to be unaware of the special groups targeted under the scheme – children suffering from measles. Similarly, VHNs were not aware about the name of the national anemia control programme.

Knowledge about the age of target groups, dosages and frequency of distribution: At least a few of the VHNs and ICDS-AWWs expressed the measure in terms of half a spoon and full spoon rather than referring to the measuring circle marked inside the scoop. Problems of dosage could crop up, especially when the solution is administered to infants and antenatal mothers. It may be noted that, though this happens very rarely, when it does happen, it could pose a major problem to the credibility of the health care delivery system as a whole since, in the not-so-distant past, a few children lost their lives due perhaps to inappropriate dosage. Nevertheless, there seems to be a reasonably good understanding about the frequency of administration of the syrup and the timing of administration during a calendar year.

In the case of the anemia control program, there was ambiguity in their understanding about the age of one target group, i.e. adolescent girls, which has a bearing on the efficiency of service delivery as well as the reach of the program. However, there seemed to be no ambiguity about the dosage for the corresponding target groups and duration of supplementation, though some confusion existed regarding the month of commencement of tablets for AN mothers. For the health administration in that area, the first priority is for AN and PN women, followed by adolescent girls. As the target group of adolescent girls was added to the program later by the Tamil Nadu government, a shortage in supply sometimes affects the distribution of tablets to this age group. There also seemed to be a shortage of supply for children aged 3–5 years as we could not see a single strip of this tablet during our visits.

Thus, the training program for VHNs and ICDS-AWWs should emphasize the target age groups and corresponding dosages as well as the need for measuring the solution in the standard scoop that comes with the vitamin A solution.

**Conclusions and recommendations**

The prevalence of nutritional deficiencies in the community, especially VAD and IDA, continues to be a problem of public health significance in India, despite the existence of the vitamin A prophylaxis and anemia control programs for nearly three and a half decades. National-level surveys reveal that the coverage of the programs is sub-optimal and so there is scope for renewed efforts to improve it by exploring all avenues that can play a role at various levels of its implementation.

At the grass-roots level, there is lack of awareness among VHNs and ICDS-AWWs, who are the service providers, about the official name of the program and the age of target groups with their corresponding dosages and frequency of administration. This is compounded by a similar lack of awareness among the users about what is being administered and its purpose; they are unable to demand services if they have not received them. These are major obstacles to the reach and efficiency of the delivery system of these programs that need to be addressed in the training of grass-roots health care providers and through user awareness programs to increase awareness, demand and utilization of the services. These national programs have an important role in providing nutrition education to promote the consumption of nutrient-rich food items, which is a component of the program that...
Given the current suboptimal utilization of services, working with the WSHGs to increase awareness and distribute the supplements may make these programs more effective at the grass-roots level. WSHGs are also a community resource with the potential to help the programs find more sustainable approaches to promoting the cultivation and consumption of nutrient-rich foods.

Acknowledgements

The authors wish to thank the management of PSG & Sons Charities Trust and Dr. S. Ramalingam, principal of PSG IMS&R, for the facilities provided to carry out the study. They are also grateful to SIGHT AND LIFE for the grant provided to conduct this study.

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