

A Strategy for Scaling-Up Vitamin A Supplementation in a Remote Rural Setting

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Abstract—Vitamin A deficiency is a public health problem in Zimbabwe. Addressing vitamin A deficiency has the potential of enhancing resistance to disease and reducing mortality especially in children less than 5 years. We implemented and adapted vitamin A outreach supplementation strategy within the National Immunization Days and Extended Programme of Immunization in a rural district in Zimbabwe. Despite usual operational challenges faced this approach enabled the district to increase delivery of supplementation coverage. This paper describes the outreach strategy that was implemented in the remote rural district. The strategy covered 63 outreach sites with 2 sites being covered per day and visited once per month for the whole year. Coverage reached 71% in an area of previous coverage rates of around less than 50%. We recommend further exploration of this strategy by others working in similar circumstances. This strategy can be a potential way for use by Scaling-Up-Nutrition member states.

Keywords—Coverage, Strategy, Supplementation, Vitamin A.

I. INTRODUCTION

IN developing countries it is estimated that deficiencies in Iron, zinc and vitamin A each rank among the top ten leading causes of death [1]. In Africa about 350 million children and women suffer from deficiencies in vitamin A and iron [2]. These deficiencies usually do not manifest easily and hence present as “hidden hunger” [3]. Zimbabwe is no exception to the effects of micronutrient deficiencies and “hidden hunger”. Results of a micronutrient survey in 1999 showed high prevalence of iron deficiencies in pregnant women (33%), followed by lactating women (29.6 %) and preschool children (17.6%) [4]. A 35.8% prevalence of vitamin A deficiency among young children (12-71 months) and 18% among school going children was reported from the same survey. Slight improvements were only reported for iodine deficiency which was attributed to changes in food regulations (salt iodization) implemented in the country from a 1991[5].

Zimbabwe was categorized by the World Health Organization (WHO) as being at high risk of vitamin A

deficiency in 1997 [6]. Several initiatives have and/or are being implemented to address vitamin A deficiency including food fortification, education to increase the consumption of foods rich in Vitamin A and high dose oral supplements [5]. However provision of vitamin A supplements remains a major strategy in addressing vitamin A deficiency in the country.

The results of the 1999 micronutrient survey which showed high levels of vitamin A deficiency in Zimbabwe [4] lead to the country adopting WHO recommendations for vitamin A supplementation to children and women. The National vitamin A supplementation programme was thus initiated in 2001[7]. In 2002 with funding from UNICEF vitamin A supplementation was integrated into the national immunization days (NIDs) and the expanded programme on immunization (EPI) [5] [8]. The 2003 national nutrition and EPI survey found that the vitamin A capsules distributed through the NIDs and EPI efforts had reached a target of only 46% of the targeted population [5]. Worse still, the food and nutrition survey surveillance in 2004 observed that only 23% of assessed children had received vitamin A in the past 6 months. In terms of coverage, it was found that in remote rural areas up to 90% of the children did not get Vitamin A supplementation [9]. Support from Hellen Keller International (HKI) then increased coverage in 2006, to 65% at the second dose [8]. This was attained through the child health days and taking advantage of integrated measles campaigns. The HKI initiative was implemented in all districts across the country [8]. In 2010 the vitamin A supplementation national coverage was again low at 49% [10]. This was attributed to several factors including economic changes which occurred in the country and HKI pulling out of the country, a common problem with donor dependent programmes. This situation led some stakeholders in the country to advocate for a need for the formulation of additional strategies to bring about more sustainable vitamin A supplementation and equipping national staff to implement the strategies [5].

The aim of this paper is to describe a vitamin A supplementation outreach strategy implemented in one of the remote rural districts in Zimbabwe, which was successful in increasing coverage under the difficult circumstances the country was facing at the time.

II. METHOD

A. Implementation Team and Process

The Gokwe-North district initiated and adapted a vitamin A supplementation outreach strategy within the national NIDs

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and EPI programme in 2011. This program involved collaboration of departmental heads from different key government departments (nursing, nutrition, health education and promotion, administration and accounting) and their different responsibilities are listed in Table I. A nursing officer was responsible for the overall co-ordination of the programme. The implementers in the programme who formed the key members was a team of EPI nurses being a mix of registered general nurses (RGN) and primary care nurses (PCN). The responsibilities given in Table I, did not require specialized personnel, in regions where staffing was a challenge. Lower level staff could be trained to carry-out the different responsibilities.

TABLE I
DIFFERENT DEPARTMENTAL PERSONNEL AND THE RESPONSIBILITIES TO THE
OUTREACH PROGRAMME

| Departmental Personnel | Key Responsibilities and Contributions |
|---|--|
| District Nursing Officer | EPI manager and co-ordination(vitamin A orders and assigning of staff for outreach |
| District Nutritionist | Vitamin A supplementation manager and specialized co-ordination of vitamin A supplementation Monitoring and coverage |
| District Pharmacist | General drug,vaccines and vitamin A management for the program and whole district |
| District Health Education and Promotion Officer | Co-ordination of Information Education Communication materials (vitamin A flyers) |
| District Health Services Administrator | Program logistics co-ordinator (Transport and general supplies) |
| Accountant | Field allowances(subsistence) calculation and general program financing |
| Village health workers | Mobilization of communities and overall facilitators at implementation level |

The team led by the nursing officer designed a year EPI outreach schedule (Table II and III). For the purposes of this paper, outreach will be narrowed down to vitamin A supplementation only, excluding the routine vaccines which went together with the programme. Outreach sites were determined in consultation with village health workers to ensure reach of furthest areas from the rural health centers (RHC) were adequately covered. Part of the planning of the outreach program involved ordering of vitamin A supplements from the provincial EPI department to the district. Distribution from the district was logistically done by the teams as they went to their respective outreach sites. The outreach sites were visited once per month in the year. In other circumstances when funding was available for fuel and special district inventory program implementation distribution was done by the district administrator.

An outreach team consisted of four members, three EPI nurses responsible for supplementation and a driver. Two teams were used for the whole district of 234 673 population

size as per 2011. Travelling distances to the supplementation sites taking the whole district approximately totaled to more than one thousand kilometers of gravel road and mostly rough. These nurses formed part of the nurses originally stationed in the EPI department at the district which normally had the largest number of staff. The nurses were responsible of the outreach program to ensure reach of those who fail to get supplementation at their nearest RHC. The two teams were strategically allocated to cover the eastern and western blocks (Table II and III) of the district. A team would camp in the field for five days and were supported with general supplies (food and general needs) from the district health services fund and UNICEF offered a small once off funding twice in the year to cover fuel and allowances. The allowances were calculated using prevailing government rates and used to cover for about four months. Accommodation was provided by the rural health centers (RHC) located close to the sites where outreach was implemented. This was to ensure no costs were incurred by the nurses and as an appreciation from the RHC to the commitment of the team in covering their catchment area.

The teams would carry out vitamin A supplementation at different outreach sites. They were covered in the morning and afternoon as per supplementation schedule (Table II and III). All this would be the activities for that particular month. The demand for supplementation at sites for the following month was initiated by the mobilizing efforts of the village health workers. Within the communities messages were spread of the team having passed making those who had been missed to anticipate the next supplementation date. Ultimately this resulted in an area being visited once every month for the whole year. To illustrate this for example in the eastern block, E₁ and E₂ would be visited for the whole 12 months at different dates of the calendar month as shown in Table II.

After every day's supplementation, a team leader would take time to update that day's statistics. This update included compilation of the numbers supplemented at a particular point, supplements provided and any wastage. The nutritionist or any district executive member would do a follow-up supervision to check on the statistics and for any other supervisory roles as a way to support the outreach teams. A monthly consolidation of statistics to address challenges for that particular month was done.

Village health workers (VHW) were central to ensuring mobilization at the community level for supplementation. This mobilization was supported by an initial mobilization before supplementation outreach under the responsibility of the health education and promotion office (HEPO). Furthermore the HEPO would provide Vitamin A supplementation brochures in vernacular and English which the teams would distribute to mothers and caregivers as take-home brochures.

B. Calculation of Coverage Rates

Vitamin A coverage was calculated using the WHO assumption of taking 90% of 17% of the total population as an estimate of our 6-59 months age-group population [11].

Coverage was then calculated by using the formula.

Vitamin A coverage 6-59 months:

$$\frac{\text{Number of children 6-59 months old given Vitamin A}}{\text{Estimated Total children 6-59 months old in the target}} * 100$$

III. RESULTS AND DISCUSSION

Based on the district population for 2011 of 234 673 a total catchment population of 35 905 children 6-59 months was determined. Of these 25 666 children 6-59 old were given vitamin A in the total 12 months of supplementation in the district. Coverage was 71% from this strategy a rate that supersedes the 49% coverage rates reported after HKI pulled out of Zimbabwe. Wastage levels were relatively low around less than 10% being reported from the outreach supplementation program.

The one-year Vitamin A schedule was implemented in both the eastern and western blocks of the district (Table II and III). Challenges were faced at particular times especially due to limited or delay in accessing resources (fuel mainly and food supplies). This would result in the teams having to leave late for their designated sites and ultimately resulting in loss of some children who would have been mobilized for a particular day. The other uncertainties which the teams faced were, in cases where a medical emergency would occur and the outreach vehicle would be used as the ambulance. This would affect the movements of the teams to ensure meeting their intended targets for the day.

Taking into consideration that the program was in its initial stage and despite the challenges faced our results therefore indicate a potential strategy that can contribute towards ensuring the delivery of Vitamin A in difficult to reach areas as in the district we worked in.

In 2005, with a national coverage of 22.3% the best coverage contribution of 50% was from an urban area. For rural areas a range of between 81.9% - 96.9% of children did not receive vitamin A in the previous six months [9]. To provide for children (6 – 59 months) receiving a preventive dose every 6 months, the country followed varied strategies at different locations (urban and rural). Coverage's was higher as supplementation was relatively easier to implement in urban areas. This was attributed to the fact that urban communities were more accessible (transport, staff and general supplies). Supplementation messages were easier to disseminate due to radio and television broadcast, which is good within urban areas in the country. On the other hand, supplementation in rural areas present a different scenario of "hard to reach" areas [12]. "Efforts to provide Vitamin A supplements to remote rural regions are important, for children under 5 years especially in remote areas where children may be more vulnerable to morbidity and mortality [13], [11]. Children under these types of circumstances have been reported to be born with negligible Vitamin A stores while at the same time having high exposure to frequent infections. In addition they

are also less likely to not receive adequate Vitamin A through breast milk in the first 6 months of life especially if the mother is malnourished [14]. Through efficient and effective delivery of Vitamin A supplements to such population set ups, it would contribute to protecting the children against their increased vulnerability to vitamin A deficiency and its consequences [11].

It was possible to implement a vitamin A outreach supplementation strategy within the existing NIDs and EPI programme in a rural Zimbabwean district despite sometimes harsh operational conditions Teams were affected by harsh weather conditions and this was most felt by the outreach program starting in March for the western block Table III. In summer due to rains some areas became totally unreachable. This was due to the poor state of roads and hence the vehicles would not be able to reach some places. Winter was better since it was fairly easy to reach most places due to accessibility of the roads at this time of the year.

The involvement of the different stakeholders in the entire process from planning to implementation was useful. It is important to realize the importance of collaboration and consultation of provincial and district level nutrition programme in all the planning activities on vitamin A supplementation from the very earliest moments [14].

TABLE II
DISTRICT EXPANDED PROGRAM ON IMMUNIZATION AND VITAMIN A SUPPLEMENTATION SCHEDULE 2011 EASTERN (E) BLOCK-ADJUSTED TO PRESENT ACTIVE SUPPLEMENTATION DATES

| Outreach Point Code and point number | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| E ₁ & E ₂ | 10 | 7 | 7 | 4 | 9 | 6 | 4 | 8 | 12 | 10 | 7 | 5 |
| E ₃ & E ₄ | 11 | 8 | 8 | 5 | 10 | 7 | 5 | 9 | 13 | 11 | 8 | 6 |
| E ₅ & E ₆ | 12 | 9 | 9 | 6 | 11 | 8 | 6 | 10 | 14 | 12 | 9 | 7 |
| E ₇ & E ₈ | 13 | 10 | 10 | 7 | 12 | 9 | 7 | 11 | 15 | 13 | 10 | 8 |
| E ₉ & E ₁₀ | 14 | 11 | 11 | --- | 13 | 10 | 8 | 12 | 16 | 14 | 11 | 9 |
| E ₁₁ & E ₁₂ | 17 | 14 | 14 | --- | 16 | 13 | 11 | 15 | 19 | 17 | 14 | 12 |
| E ₁₃ & E ₁₄ | 18 | 15 | 15 | 12 | 17 | 14 | 12 | 16 | 20 | 18 | 15 | 13 |
| E ₁₅ & E ₁₆ | 19 | 16 | 16 | 13 | 18 | 15 | 13 | 17 | 21 | 19 | 16 | 14 |
| E ₁₇ & E ₁₈ | 20 | 17 | 17 | 14 | 19 | 16 | 14 | 18 | 22 | 20 | 17 | 15 |
| E ₁₉ & E ₂₀ | 21 | 18 | 18 | 15 | 20 | 17 | 15 | 19 | 23 | 21 | 18 | 16 |
| E ₂₁ & E ₂₂ | 24 | 21 | 21 | 18 | 23 | 20 | 18 | 22 | 26 | 24 | 21 | 19 |
| E ₂₃ , E ₂₄ & E ₂₅ | 25 | 22 | 22 | 19 | 24 | 21 | 19 | 23 | 27 | 25 | 22 | 20 |
| E ₂₆ & E ₂₇ | 26 | 23 | 23 | 20 | 25 | 22 | 20 | 24 | 28 | 26 | 23 | 21 |
| E ₂₈ & E ₂₉ | 27 | 24 | 24 | 21 | 26 | 23 | 21 | 25 | 29 | 27 | 24 | --- |
| E ₃₀ & E ₃₁ | 28 | 25 | 25 | 28 | 27 | 24 | 22 | 26 | 30 | 28 | 25 | --- |

Where dates are not presented it symbolizes when supplementation was not done. Actual site names replaced with codes for readability and reproducibility.

TABLE III
DISTRICT EXPANDED PROGRAM ON .I AND VITAMIN A SUPPLEMENTATION SCHEDULE 2011 WESTERN (W) BLOCK-ADJUSTED TO PRESENT ACTIVE SUPPLEMENTATION DATES

| Outreach Point Code and point number | March | April | May | June | July | August | September | October | November | December |
|---|-------|-------|--------|------|------|--------|-----------|---------|----------|----------|
| W ₁ & W ₂ | 6 | 10 | 14 | 11 | 9 | 13 | 10 | 8 | 7 | 3 |
| W ₃ & W ₄ | 7 | 11 | 15 | 12 | 10 | 14 | 11 | 9 | 8 | 4 |
| W ₅ & W ₆ | 8 | 12 | 16 | 13 | 11 | 15 | 12 | 10 | 9 | 5 |
| W ₇ & W ₈ | 9 | 13 | 17 | 14 | 12 | 16 | 13 | 11 | 10 | 6 |
| W ₉ & W ₁₀ | 10 | 14 | 18 | 15 | 13 | 17 | 14 | 12 | 11 | 7 |
| W ₁₁ & W ₁₂ | 13 | --- | 21 | 18 | 16 | 20 | 17 | 15 | 14 | 10 |
| W ₁₃ & W ₁₄ | 14 | 18 | 22 | 19 | 17 | 21 | 18 | 16 | 15 | 11 |
| W ₁₅ & W ₁₆ | 15 | 19 | --- | 20 | 18 | 22 | 19 | 17 | 16 | 12 |
| W ₁₇ & W ₁₈ | 16 | 20 | 24 | 21 | 19 | 23 | 20 | 18 | 17 | 13 |
| W ₁₉ , W ₂₀ , & W ₂₁ | 17 | --- | 25 | 22 | 20 | 24 | 21 | 19 | 18 | 14 |
| W ₂₂ , W ₂₃ , & W ₂₄ | 20 | --- | 28 | 25 | 23 | 27 | 24 | 22 | 21 | 17 |
| W ₂₅ & W ₂₆ | 21 | 25 | 29 | 26 | 24 | 28 | 25 | 23 | 22 | 18 |
| W ₂₇ & W ₂₈ | 22 | 26 | 30 | 27 | 25 | 29 | 26 | 24 | 23 | 19 |
| W ₂₉ & W ₃₀ | 23 | 27 | 31 | 28 | 26 | 30 | 27 | 25 | 24 | --- |
| W ₃₁ & W ₃₂ | 24 | 28 | 1 June | 29 | 27 | 31 | 28 | 26 | 25 | --- |

Where dates are not presented it symbolizes when supplementation was not done. Actual site names replaced with codes for readability and reproducibility.

IV. CONCLUSION

Following a highly organized Vitamin A supplementation outreach program can contribute to enhanced delivery of Vitamin A coverage. The adaptation of the supplementation process within existing structures resulted in a strategy with potential to improve coverage in hard to reach rural districts in Zimbabwe. We recommend further exploration of this strategy by others working under similar circumstances and as a potential strategy for Scaling up Nutrition (SUN) member states.

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REFERENCES

- [1] T. A. Tulchinsky, "Micronutrient Deficiency Conditions: Global Health Issues," *Public Health Reviews*, vol. 32, 2010, pp. 243–245.
- [2] L. Allen, B. de Benoist, O. Dary and R. Hurrell, *Guidelines on food fortification with micronutrients*. World Health Organization and Food and Agricultural Organization of the United Nations, Geneva: World Health Organization, 2006.
- [3] G.G. Harrison, "Public health interventions to combat micronutrient deficiencies," *Public Health Reviews*, vol. 32, 2010, pp. 256–266.
- [4] Ministry of Health and Child Welfare. "National Micronutrient survey report", 1999.
- [5] T.H. Gadaga, R. Madzima, and N. Nembaware, "Status of Micronutrient Nutrition in Zimbabwe: A review". *African Journal of Food Agriculture Nutrition and development*, vol. 9, issue 1, January 2009.
- [6] WHO, UNICEF, IVACG Task Force. "Vitamin A supplements: a guide to their use in the treatment and prevention". Switzerland, 1997.
- [7] M.F. Miller, R.J. Stoltzfus, P.J. Iliff, L.C. Malaba, and N.V. Mbuya, the Zimbabwe Vitamin A for Mothers and Babies Project (ZVITAMBO) Study Group, and J.H. Humphrey. "Effect of maternal and neonatal vitamin A supplementation and other postnatal factors on anemia in Zimbabwean infants: a prospective, randomized study". *The American Journal of Clinical Nutrition*, American Society for Nutrition, 2006.
- [8] S.K. Baker, V. Aguayo, and D. Garnier, "Post National Immunization Days vitamin A coverage in high-risk countries in sub-Saharan Africa," *HKI Annual Progress Report EEE*, May. 2007.
- [9] S.J. Atwood, T.G. Sanghvi, V. Sharma, and N. Carolan, "Stability of vitamin A in fortified vegetable oil and corn soya blend used in child feeding programmes in India", *Journal of Food Composition and Analysis*, 1995, pp 32–44.
- [10] UNICEF, "Zimbabwe country statistics-Nutrition," 2010.
- [11] T. Sanghvi, and R. Fields, "Distribution of Vitamin A during national immunization days: A "generic" addendum to the Field guide for supplementary activities aimed at achieving polio eradication," WHO, 1999, pp 27,.
- [12] D.A. Ross, "Recommendations for Vitamin A Supplementation. *Journal of Nutrition*". American Society for Nutritional Sciences, 2002.
- [13] WHO, UNICEF, IVACG Task Force. *Vitamin A supplements: a guide to their use in the treatment and prevention*, Switzerland, 1997.
- [14] S. Horton, F. Begin, A. Greig and A. Lakshman, "Best Practices Paper: Micronutrient Supplements for child survival (Vitamin A and Zinc): Copenhagen Consensus Center", 2009.