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Chapter 7: Vitamin A deficiency Pages 75 – 80

CHAPTER 7. VITAMIN A DEFICIENCY

This chapter summarizes indicators related to vitamin A deficiency among children 6-59 months old and non pregnant women 15-49 years of age. Vitamin A deficiency (<0.7µmol/l) was assessed by measuring retinol binding protein (RBP) on dried blood spots (DBS). Vitamin A status is affected by inflammation. The data are presented including and excluding children with inflammation as determined by elevated C-reactive protein (CRP) (>5mg/L) and/or elevated α 1-acid glycoprotein AGP (>1.2 mg/L).

7.1 Vitamin A deficiency among children 6-59 months

The prevalence of vitamin A deficiency in children 6-59 months of age including those with signs of inflammation is 25.6% and excluding inflammation (CRP and/or AGP) 15.7%. The prevalence of low RBP by demographic characteristics is presented in Table 7.1.

Children in the Mamose region are most at risk of vitamin A deficiency and children in urban areas are also more likely to be vitamin A deficient. Children in Mamose are more likely to be vitamin A deficient due to infection than children in other parts of the country. Figure 7.1 presents the regional prevalence of vitamin A deficiency including and excluding children with elevated acute phase proteins.

According to the WHO, criteria Vitamin A deficiency is considered to be a moderate public health problem if the prevalence is 10-20% and severe if the prevalence is $\geq$ 20%. Nationally the problem can be determined as moderate but in Mamose the problem is severe. In urban areas, the problem is also more severe than in rural areas.

Table 7.1 Prevalence of vitamin A deficiency for children 6-59 months, including and excluding inflammation[2]. PNG National Nutrition Survey 2005

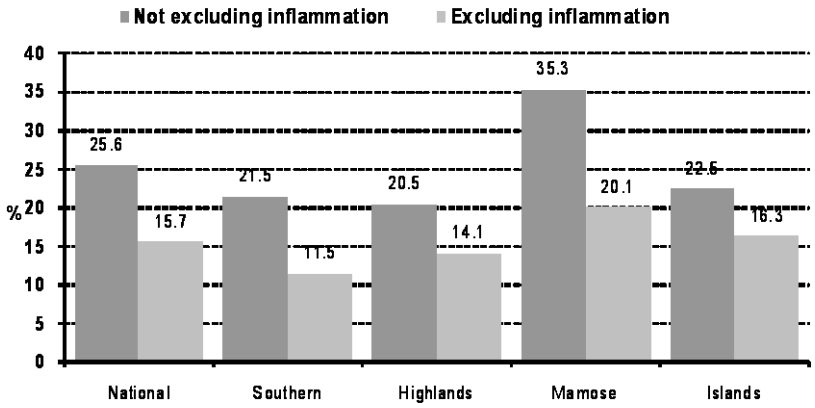
Demographic Characteristics	Prevalence of VAD [1]					
	All children			Excluding children with inflammation		
	N	Vitamin A deficiency (%)	95% CI	N	Vitamin A deficiency (%)	95% CI
National	**875**	**25.6**	**21.7, 30.1**	**591**	**15.7**	**12.6, 19.4**
Region						
Southern	195	21.5	15.1, 29.8	122	11.5	6.7, 19.0
Highlands	195	20.5	13.6, 29.8	149	14.1	10.5, 18.6
Mamose	241	35.3	27.4, 44.0	154	20.1	13.3, 29.4
Islands	244	22.5	15.2, 32.0	166	16.3	9.0, 27.6
Residence						
Urban	164	30.5	23.1, 39.2	119	21.4	13.9, 31.4
Rural	711	24.5	19.9, 29.7	472	14.3	11.2, 18.0
Sex						
Male	467	27.1	22.5, 32.2	307	17.1	13.3, 21.6
Female	405	24.1	19.4, 29.6	281	14.4	10.7, 19.2
Age Group (months)*						
6-11	95	37.8	27.4, 49.6	63	25.3	15.6, 38.4
12-23	209	27.0	21.4, 33.6	135	14.1	9.1, 21.2
24-59	221	24.8	18.2, 32.9	144	14.6	8.3, 24.3
36-47	189	22.6	16.8, 29.7	119	13.2	8.1, 20.9
48-59	158	21.8	15.9, 29.1	127	16.9	11.8, 23.5

Weighted analysis to account for complex survey design

[1] VAD retinol binding protein<0.7µmol/l

[2] Inflammation was defined as having elevated CRP (>5mg/L) and/ or AGP (>1.2 mg/L)

Figure 7.1 Prevalence of Vitamin A deficiency, including and excluding children with inflammation, PNG National Nutrition Survey 2005



7.2 Retinol binding protein (RBP) among non-pregnant women 15-49 years

The prevalence of vitamin A deficiency in non-pregnant women of child bearing age (15-49 years) in PNG was 0.7%.

7.3 Self-assessed clinical sign of vitamin A deficiency, poor eye sight

Questions concerning difficulty in vision during the last pregnancy were restricted to women of childbearing age who had reported at least one pregnancy during the three years prior to the survey.

Out of the 357 women who responded, 12.3% of women reported difficulties with their vision during their last pregnancy in the daytime and 9.0% at dusk. Out of all these 357 women, only 6 reported to have vision problems during dusk but not in the day (1.7%), which would suggest night blindness. Due to the vast numbers of local languages, the survey did not attempt to identify local terms for night blindness.

7.4 Vitamin A supplementation

A total of 52.7% of children 6-59 months of age had ever received a vitamin A capsule and 15.5% received a vitamin A capsule in the previous 6 months (Table 7.2). Of those that could recall where they had obtained the capsule 45.5% had obtained it from routine health center visits and 51.4% from supplementary immunization activities.

Table 7.2 Prevalence of children 6-59 months who had ever taken a vitamin A capsule and prevalence of those that had taken it in the last 6 months, PNG National Nutrition Survey 2005

Demographic Characteristics	N	Ever taken a vitamin A capsule (%)	95% CI	Taken vitamin A supplement in ≤ 6 months (%)	95% CI
National	**933**	**52.7**	**46.3-59.0**	**15.5**	**11.0, 21.4**
Region					
Southern	224	56.3	40.9- 70.5	8.4	4.5, 15.3
Highlands	208	39.9	30.0-50.7	12.0	7.4, 18.7
Mamose	255	61.6	48.3- 73.3	24.3	13.0, 40.8
Islands	246	56.9	44.2-68.7	15.0	7.3, 28.4
Residence					
Urban	180	52	41.9-61.8	15.5	9.3, 24.6
Rural	753	52.9	45.3-60.4	15.4	10.3, 22.7
Sex					
Male	503	55.2	48.5-61.7	16.5	12.1, 22.6
Female	430	49.7	42.0-57.5	14.1	9.1, 21.3
Age Group (months)*					
6-11	106	49.8	38.2-61.5	42.1	30.6, 54.5
12-23	220	51.8	42.2-61.2	21.6	14.3, 31.1
24-59	234	53.4	44.6-62.1	8.0	4.7, 13.4
36-47	195	51.9	42.7-61.1	8.6	4.5, 15.6
48-59	166	56	47-64.6	9.2	4.1, 19.1

Weighted analysis to account for complex survey design

7.5 Discussion: Vitamin A

Vitamin A status in PNG was assessed in children 6-59 months and in women 15-49 years using retinol binding protein (RBP) on dry blood spots. Ideally serum retinol would have been measured, as it is the gold standard for assessing vitamin A status, but logistical limitations meant that an alternative was needed. Retinol binding protein (RBP) is a suitable alternative to serum retinol (Gorstein 2008).

Serum retinol values are affected by inflammation but it is uncertain how RBP is affected by acute phase proteins such as CRP and AGP. Recent publications have proposed adjusting data to account for the effects of inflammation rather than discarding data (Thurnham 2008) but we were unable to do that in this analysis as the adjustments, so far, have only been proposed for serum ferritin and retinol. Therefore, the vitamin A data, as determined by RBP, is presented including and excluding for inflammation. As

these data will be used to make policy and programmatic decisions, rather then for research purposes, it was appropriate to present the data in both ways.

The data shows that both including and excluding those with either marker of inflammation, vitamin A deficiency is a moderate to severe problem for children in Papua New Guinea and almost non existent in women of reproductive age. Among children in Mamose region the prevalence is higher than in the other 3 regions. Children in urban areas are also more likely to be vitamin A deficient than children in urban areas. This may be because they are less able to access fresh fruits and vegetables rich in vitamin A in urban areas.

Just over 50% of all children 6- 59 months had ever received a vitamin A capsule. Children in Mamose were most likely to have ever received a capsule and children in the Highlands least likely. Although it is not possible to determine from the data how many children had received the required number of capsules they were eligible for, 15.5% of children 6-11 months had received a capsule in the last 6 months. Despite the fact that children in Mamose had received more capsules than children in other parts of PNG there exposure to infections and malaria are likely to be more and overall their nutritional status appears to be worse. Interventions such as vitamin A supplementation need to be consistently delivered to all children so that children receive supplements routinely.