A PILOT SURVEY TO ASSESS THE VITAMIN A STATUS OF CHILDREN AGED 6-72 MONTHS IN THE RAMU REGION OF PAPUA NEW GUINEA

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DECLARATION

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.

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Nitin Verma

DEDICATED TO THE CHILDREN OF PAPUA NEW GUINEA

ACKNOWLEDGMENTS

I did not realise that what started out as a casual discussion in the economy class cabin of an Air Niugini Airbus, would ever become a research work. This thesis would not have been completed without the help of many people who would become involved in this project. To them, and any that I may have omitted to mention, I am very grateful.

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Nitin Verma

FORWARD

"Every thousand mile journey begins with one small step"

Anon

The author was the Chief Ophthalmologist of Papua New Guinea from 1994 to 1997. This project was undertaken in response to a question of the vitamin A status of children in the country that remained unanswered for a long time and was the subject of some controversy and concern between the medical fraternity and the UNICEF representation in PNG.

The role of Vitamin A in the growth of children and in the maintenance of good health is becoming increasingly apparent, as are the subtle, yet serious, consequences of its deficiency. The classical ocular signs of Xerophthalmia subsequent to vitamin A deficiency (VAD) are a rarity in clinical practice in PNG. Observed ocular changes suggestive of VAD in PNG are often secondary to debilitating illnesses such as measles and tuberculosis in children. The problem of malnutrition in mothers and children is very real and the causes, multi-factorial. Deficiencies of other micronutrients possibly co-exist with VAD. These need to be addressed in addition, if one were to offer a holistic solution to the problem of high childhood morbidity and mortality that exists in PNG.

Based on an earlier study, Papua New Guinea has been classified by the WHO as a country where clinical Vitamin A deficiency exists and suggestions have been made to fortify foods so as to improve the intake of this vitamin. Singular administration of Vitamin A is fraught with the danger of taking the focus of involved governmental and non-governmental agencies away from the bigger problem of malnutrition and

infectious diseases, which are multifactorial in their occurrence. In addition, the dangers of Vitamin A toxicity are well known and therefore mass fortification of foods with the vitamin on a national scale needs to be looked at with some caution.

Papua New Guinea has a high infant mortality rate and it is quite possible that Vitamin A deficiency has some part to play in the increased prevalence of childhood infections. The per capita expenditure on health in many developing countries is low and PNG is no exception. Every dollar needs to be carefully spent and the health problems of the people and the possible solutions need to be addressed in a careful manner.

This pilot study was undertake to resolve this matter on a scientific basis and to pave the way for larger studies that need to be carried out in various parts of the country so that a national policy or guidelines could be formulated.

While the survey was going on, what can be described as one of the largest multi-disciplinary health patrols in the history of Papua New Guinea was carried out. Using boats, a barge, fixed wing aircraft and 2 helicopters, sixty health personnel were engaged in a nutritional survey, surgical eradication of cataract blindness, immunisation and provision of general medical services in one of the most remote and under served areas of Papua New Guinea. Feeding, housing, moving and looking after them in rural PNG was a task in itself. This effort was endorsed and supported by the PNG Department of Health and many Non Governmental organisations and individuals. Their help has been gratefully acknowledged earlier.

Health care delivery in developing countries is difficult because of many reasons and it is hoped that surveys such as this would in their own way give some direction to policy makers in the Government. This would give the people who participated ion the

survey a lot of satisfaction by making their efforts and personal sacrifice more rewarding and meaningful.

The main report attempts to be relevant to lay people without sacrificing content. I have left out a lot of details from the body of the report to try and make it uncomplicated and readable. I have tried to support the assertions with references and the figures and tables with statistical details but have not included any references to any appendix sections in order to keep the text and diagrams in the main body of the treatise, simple.

Nitin Verma

Darwin 2000

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LIST OF ABBREVIATIONS AND TERMS USED

ACC/SCN	United Nations Administrative Committee on Coordination/Subcommittee on Nutrition
AT	Alpha Tocopherol
AT/CT	Alpha Tocopherol/Cholesterol ratio
AUSAID	Australian Agency for International Development
BMI	Body Mass Index
CIC	Conjunctival Impression Cytology
CT	Cholesterol
DHS	Demography and Health Survey (1991-PNG)
DOH	Department of Health (PNG)
EPI	Expanded Program of Immunisation
FAO	Food and Agriculture Organisation of the United Nations
HAM	Height Age Median
HAP	Height Age Percentile
HAZ	Height Age Z Score
HKI	Helen Keller International
HPLC	High Pressure Liquid Chromatography
ICN	International Conference on Nutrition
ICT	Impression cytology with transfer
IDA	Iron deficiency anaemia
IDD	Iodine deficiency disorders
IEC	Information, education and communication
IMR	Infant Mortality Rate
IVACG	International Vitamin A Consultative Group
KAP	Knowledge Attitudes and Practice
MCH	Maternal and child Health
MDIS	Micronutrient Deficiency Information System
MOMASE	Morobe -Madang-Sepik (region in PNG)
MSG	Monosodium Glutamate
MUAC	Mid Upper Arm Circumference
NDOH	National Department of Health (PNG)

NGO	Non Governmental Organisation
NNT	Neonatal Tetanus
ORS	Oral Re-hydration Solution
ORT	Oral Re-hydration Therapy
PEM	Protein Energy Malnutrition
PMGH	Port Moresby General Hospital
PNG	Papua New Guinea
RDA	Recommended dietary allowance
RDR	Relative dose response
RE	Retinol equivalents
SEAR	South-East Asia Region
STD	Sexually Transmitted Diseases
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
UPNG	University of Papua New Guinea
USAID	United States Agency for International Development
VAD	Vitamin A Deficiency
VAST	Vitamin A Supplementation Trials
VITAL	Vitamin A field Support Project
WAM	Weight Age Median
WAP	Weight Age Percentile
WAZ	Weight Age Z Score
WHM	Weight Height Median
WHO	World Health Organisation
WHZ	Weight Height Z Score
WPR	Western Pacific Region

SOME RELEVANT WORDS AND EXPRESSIONS IN

PAPUA NEW GUINEA PIDGIN

Aeroplane	balus
Baby	pikinini
Blood	blut
Boat	bot
Breast Feeding Mother	Susu mama
Doctor	dokta
Eye	ai
Food	kaikai
Faeces	pekpek
Green leafy vegetable	kumu
Injection	sut
Man	man
Medicine	marasin
Milk	susu
Mother	mama
Night blindness	ai tu tak long nait
Sweet potato	kaukau
Water	wara
Woman	meri

SYNOPSIS

Papua New Guinea has been classified by the World Health Organisation as an area where clinical vitamin A deficiency (VAD) exists. This is at variance with the experience of the local physicians who do not encounter classical VAD in clinical practice.

This pilot study was carried out to resolve this contradiction, since many suggestions have been made to fortify foods with Vitamin A. If done in the absence of concrete data to back up this classification, it could take the focus away from the real problem as well as potentially create problems of Vitamin A toxicity. Therefore, answers from this study could have far reaching implications in a country such as PNG, which has high childhood mortality and limited financial and manpower resources.

The objective of this study was to determine the vitamin A status and identify risk factors of VAD in children aged 6 months to 6 years in a rural area of Papua New Guinea.

The survey was carried out in the Ramu region of Madang province. Households and children were randomly selected and standard questionnaires were used to collect information about diet, previous illnesses and night blindness. The weight and height of all children was recorded and an ocular and physical examination carried out by trained personnel. In addition, haemoglobin estimation and examination of blood films for malaria parasites was carried out in all the children. In a randomly selected number of children, estimations of serum retinol and other micronutrient levels were carried out.

Results: A total of 609 children were enrolled in the study. Biochemical parameters were studied in 106 of them .The mean age of the children was 35 months. Possible night blindness was reported in 4 children. No xerophthalmia was seen. The prevalence of serum retinol levels ≤ 0.7 μmol/L (WHO suggested cut off values for subclinical VAD) was 10.3%. Anthropometric indicators indicated a high proportion of the children had stunting and wasting or both. Analysis of dietary patterns, maternal literacy, food availability and other surrogate indicators indicated that the population is at mild-moderate risk of developing VAD.

In conclusion, no evidence of clinical vitamin A deficiency was found. Subclinical vitamin A deficiency seemed to occur in this population at a level of mild-moderate public health importance. Further studies need to be carried out to assess the situation in different areas in PNG before policy decisions can be made with regards to mass vitamin A supplementation.