



Masters in Public Health

Micronutrient Malnutrition Module Guide

**School of Public Health
University of the Western Cape
South Africa**



Micronutrient Malnutrition

UWC Module Registration Number: 851848

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Readings: Readings are listed at the end of the Module Introduction. They were compiled for registered students in one or two Readers. Copyright permission was sought and paid for per reading per student. Readings are not included but their sources are indicated in the Module Guide.

Credit value of module: 20 (200 notional learning hours).

Study Materials for this module: Module Guide, two Readers (Not included here)

Target group: Health and allied health and welfare professionals with a four or more year degree (MPH)

Delivery: This module was offered as a distance learning module with optional contact sessions.

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*The **Vision** of the School of Public Health is to contribute to the optimal health of populations living in a healthy and sustainable environment in developing countries, particularly Africa, with access to an appropriate, high quality, comprehensive and equitable health system, based on a human rights approach.*

*The **Purpose** of the School is to contribute to developing policy-makers and implementers who are knowledgeable and skilled in the principles and practice of Public Health, whose practice is based on research, influenced by informed and active communities, and implemented with a commitment to equity social justice and human dignity.*

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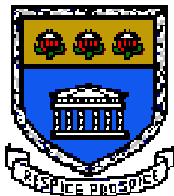
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I MODULE INTRODUCTION

1 LETTER OF WELCOME

School of Public Health (SOPH)
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Dear colleague,

Welcome to the Micronutrient Malnutrition module. We hope that you find the module interesting and that through it, you will gain confidence and sufficient knowledge in the field to design programmes and become an advocate for addressing micronutrient malnutrition where it occurs.

There are three units in the module: the first one equips you with technical information about micronutrients - their characteristics and effects. This information may be fairly familiar to those of you with a nutrition background, so some of you may be able to work quickly through this unit. The second unit concentrates on the planning of micronutrient programmes, and includes two key aspects of programming - namely intervention at policy level through advocacy, and programme monitoring and evaluation. The third unit consolidates the process of effective programme design in the field of micronutrient control, and presents three key approaches to addressing deficiency at population level, namely supplementation, food fortification and dietary diversification.

If you find any specific difficulties with the module or its assignments, please feel free to contact me in the course of the module. Above all, the key to succeeding with this module will be to work through it consistently, developing your assignments as you go along.

Finding your way around the Module Introduction

The introductory pages that follow provide an overview of the Module and the information you need to be familiar with to successfully complete the module. Included are the outcomes of the module, the assignment and requirements of that assignment - as well as the support and assistance you can expect from the School of Public Health. Take the time to look through this section before you begin studying.

Assessment

This module will be assessed through two assignments; if you have not received the due dates yet, check with the Student Administrator; late assignments will be penalised. Section 3 in the Module Introduction provides a brief overview of the assessment process, and section 3.4 details the assignment - what is required of you, as well as how you will be assessed.

Contact information

All the contact information that you may need is contained in the SOPH Programme Handbook. If your contact details have changed in any way, please send the Contact Details Update Form which you will find in that booklet to the Student Administrator straight away.

We hope that you will give us some feedback on your experience of this module. It's important that we understand how you experience the learning process; this will help us to improve where necessary. We will send you an evaluation form when you have submitted your assignments.

Good luck with it!

Sincerely

Module Convenor

2 INFORMATION ABOUT THIS MODULE

2.1 Acknowledgements

The authors of this module would like to acknowledge the contribution of Chantell Witten to the conceptualisation of Unit 3. Chantell Witten worked at SOPH in the field of micronutrient malnutrition from 2001 – 2004.

2.2 Module Aims and Rationale

This module, *Micronutrient Malnutrition*, aims to equip Public Health professionals with sufficient knowledge of micronutrients to recognise and address the problem of micronutrient deficiency at a community and population level. The module concentrates on four micronutrients, i.e. vitamin A, iron, iodine and zinc that are considered critical to Public Health, particularly in developing country contexts.

The module sets out a strategy for responding to micronutrient deficiency problems using the UNICEF Conceptual Framework to analyse the range of possible causes, and then the Triple A model to guide programme design. Some generic skills relating to programme design are explored, including advocacy, monitoring and evaluation, and three key intervention approaches are presented – namely micronutrient supplementation, food fortification and dietary diversification. A number of case studies demonstrating best practice in micronutrient interventions are provided.

Through studying the module and completing its assignments, we hope that you will be suitably equipped to design a comprehensive and contextually appropriate micronutrient intervention programme.

2.3 Module Outline

The module consists of three units. Unit 1 is divided into three study sessions, while Units 2 and 3 consist of four Study Sessions each. Study Sessions vary in length, and may take between five and six hours to complete. The three units are as follows:

Unit 1 - Understanding Micronutrient Nutrition.

Unit 2 - Planning Micronutrient Programmes.

Unit 3 - Micronutrient Deficiency Control Programmes.

2.4 Learning Outcomes

By the end of this module, you should be able to:

- Describe the characteristics, biochemical and physiological roles and food sources of a range of micronutrients.
- Apply detailed knowledge of key micronutrients, namely vitamin A, iodine, iron and zinc, to programme planning.
- Describe the application and limitations of recommended micronutrient intakes (RIs), namely Dietary Reference Intakes (DRIs) and the WHO Recommendations.
- Apply the two different recommended intakes in programme planning.
- Analyse the causes of micronutrient deficiencies using the UNICEF Conceptual Framework.
- Critically analyse success factors in Public Health micronutrient interventions.
- Plan policy level interventions to address micronutrient deficiencies at Public Health level.
- Develop effective Public Health micronutrient programmes using three key intervention strategies, i.e. micronutrient supplementation, food fortification and dietary diversification.
- Describe monitoring and evaluation strategies for each micronutrient deficiency control strategy.
- Select appropriate indicators for each micronutrient deficiency control strategy.
- Summarise the impact of micronutrient deficiency control programmes on health, disease and development.

2.5 Further References

You will also be expected to pursue relevant current literature and additional resource material, as required, for your assignment tasks. You will find additional references at the end of each Study Session. The UWC librarians can help you to locate relevant materials. Contact the SOPH Student Administrator to arrange a letter of permission to access other University libraries. Also see your *SOPH Programme Handbook* for further guidance on using libraries.

Relevant Websites

The following websites may be helpful to you in the course of this module:

Web Address	Organisation
http://www.fao.org	Food and Agricultural Organisation
http://www.who.int	World Health Organisation
http://www.unicef.org	United Nations Childrens Fund
http://usaid.gov	USAID

You will also be referred to a number of electronic resources in the Further Reading lists in this module.

2.6 Module Evaluation

You will be asked by your lecturer to evaluate this module once you have completed it. Please let us know how you find it as this will help us to improve the module for future students.

3 ASSESSMENT

3.1 Information about Assessment

Self assessment is built into the module in the form of Tasks, allowing you to check your progress and to address any areas of weakness. You should try to do the tasks, as this is the best way to learn.

There are two assignments for this module. The first one is formative and is weighted at 40%. The second one is summative and is weighted at 60%. An aggregate of 50% is required to pass.

You will be allowed to rewrite your first assignment if you get less than 50%. For the second assignment, you **MUST** get a minimum of 40% with no possibility of a rewrite. If your overall module result is between 45 - 49%, you will be awarded a supplementary assessment, with a maximum score of 50%. Please consult the *SOPH Programme Handbook* for more detail on the assessment arrangements.

3.2 Submitting Assignments

Please read the Guidelines for Presentation of assignments in the *Programme Handbook* (page 26-30). When sending in your assignments it is important to:

- Number the pages and staple them together.
- Attach an Assignment Cover Sheet, completed in full, to the front of each part of your assignment. Make sure you include your student number.
- Post, fax or e-mail the assignment to the Student Administrator at the address below to arrive by the due date. Do not send assignments directly to the lecturer. E-mail is preferred because the timing can be quicker.
- Type your assignment or write it in clear, legible handwriting.
- Use A4 paper and leave a margin of 3-4 cm for comments.
- Keep a copy of your assignment.

Assignment deadlines will be sent to you by the Student Administrator. All assignments must be submitted, i.e. postmarked, by the due date.

Assignments sent by post should be addressed to:
The Student Administrator
School of Public Health
University of the Western Cape
Private Bag X17
Bellville 7535
South Africa

3.3 Draft Assignments: Please read this section carefully

As you are studying at a distance, lecturers will provide feedback on Draft Assignments. However, Drafts will only be reviewed if they are received two or more weeks before the final submission date. If received less than two weeks before the submission date/deadline, they will not be accepted.

Take note that Drafts are expected to be drafts, i.e. work in progress. Use opportunities like these to check your understanding of the assignment requirements, to try out difficult parts of the assignment, and to ask questions. This feedback can be incorporated into your final version of the assignment.

3.4 Assignment Extensions

Assignments must be submitted by the dates indicated in the Assignment Deadlines notification circulated by the Student Administrator. Extensions may be granted under special circumstances but will not normally be longer than two weeks. To request an extension, contact the Student Administrator as soon as a problem arises. No extensions will be given for Draft Assignments, and no late assignments will be accepted in Semester 2.

Late submission of assignments may result in reducing your time for the next assignment, disrupting your lecturers' marking schedules, late submission of marks and therefore having to repeat the module. Please try to manage your time effectively. You'll find some guidance on doing so in the *SOPH Academic Handbook, 2005*.

3.5 Assignments for Micronutrient Malnutrition

**ASSIGNMENT 1:
DEVELOP A CONCEPTUAL FRAMEWORK OF
POSSIBLE CAUSES OF VITAMIN A DEFICIENCY IN A COMMUNITY**

**800 - 1 200 WORDS; 50 MARKS
40% OF OVERALL MODULE MARK**

Assignment Instructions

In an economically poor urban area that consists of informal and formal housing, the prevalence of sub-clinical vitamin A deficiency is 35% in children between 3 and 72 months.

Draw up a conceptual framework for the possible causes of vitamin A deficiency. Give a detailed motivation for each possible cause that is included in your conceptual framework. Use references to support your motivation. This is how your assignments will be marked:

Marking Criteria

Criteria	Marks
The conceptual framework includes all relevant causes.	20
The causes are well motivated.	20
References are included in the text and a comprehensive and accurate reference list is provided.	10
Total	50

**ASSIGNMENT 2:
PLAN A COMPREHENSIVE VITAMIN A
INTERVENTION**

MAXIMUM OF 3 000 WORDS; 100 MARKS
60% OF OVERALL MODULE MARK

Assignment Instructions

Describe and plan a comprehensive intervention programme to address the vitamin A deficiency in this community. This programme must include supplementation and dietary diversification. You must also describe how you are going to monitor and evaluate your programme, and explain and justify the expected impact of your programme.

Guidelines

A comprehensive programme includes a description of: what, by whom, how, when, where and why. It must be appropriate, applicable, accessible and targeted. Write your plan as a text, divided into sections. Here are the assignment criteria by which your assignment will be marked.

Marking Criteria

Criteria	Marks
The detailed programme is comprehensive.	40
An appropriate monitoring and evaluation strategy has been proposed.	30
Expected impact is described and well justified.	20
References are included in the text and a comprehensive and accurate reference list is provided.	10
<i>Total</i>	100

3.6 Assignment Cover Sheet

School of Public Health - University of the Western Cape

An Assignment Cover Sheet should be attached to every assignment. Please fill in all details clearly and staple this form to the front of your assignment. Alternatively, please fax it as the first page of your assignment, or develop a cover sheet like this one to e-mail with your assignment.

Full name:

Address:

Postal code:

Student number:

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Module name: *Micronutrient Malnutrition*

Module code: 851848

Convenor:

If faxed, state the total number of pages sent including this page:
Student's comments to lecturer

.....
.....

Declaration by student

I understand what plagiarism is. This assignment is my own work, and all sources of information have been acknowledged. I have taken care to cite/reference all sources as set out in the *SOPH Academic Handbook*.

Signed by the student:

The tutor's comments are on the reverse of this form

Office Use

Date received	Assessment/Grade	Tutor	Recorded & dispatched

3.7 Developing Work Plan

We estimate that a 20-credit module like this one requires approximately 200 hours of student work. You will need to work consistently to complete it. We suggest that you set your own goals for when you plan to complete each study session using the table on the next page. You are encouraged to develop your own work plan in terms of your assignment deadlines and commitments. Guidelines are provided in the *SOPH Academic Handbook*.

This module is made up of three units: Unit 1 consists of three study sessions, while Units 2 and 3 consist of four each. Each session is based upon a number of readings listed at the beginning of the study session. A session may take several study periods to complete e.g. up to 6 hours. You are expected to work consistently and regularly through the sessions, but it is a good strategy to prepare for the assignment as you work through them. Leave the week before the deadline for finalising the assignment.

The table presents a week-by-week work plan. Identify the period you have to complete this module. You probably also have a second module running concurrently. One way to manage two modules at the same time is to study one module from Monday to Wednesday, and the other from Thursday to Saturday. Educationally this is positive because the two modules should complement each other.

There are two columns for you to work in: one is for this module. The other is for your second module if this applies to you. Your work plan should take both modules and their assignment deadlines into account.

Once you have worked out a plan, put a copy of it in an obvious place, e.g. above your work table, and refer to it daily, adjusting it if you slip behind or race ahead!

WORK PLAN FOR MICRONUTRIENT MALNUTRITION AND A SECOND MODULE

WEEK	DATE	YOUR OWN WORK PLAN <i>Micronutrient Malnutrition</i>	YOUR OWN WORK PLAN FOR
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

LIST OF READINGS FOR MICRONUTRIENT MALNUTRITION

Author/s	Reference Details
Academy for Educational Development (AED), USAID.	(Aug 2000). Facts for Feeding. Breastmilk: A Critical Source of Vitamin A for Infants and Young Children. <i>Linkages</i> . Washington, DC: Academy for Educational Development: 1 - 8.
Anderson, J. J. B.	(2004). Ch 5 - Minerals. In L. K. Mahan & S. Escott-Stump. (eds). <i>Krause's Food, Nutrition & Diet Therapy</i> . 11 th Edition. Pennsylvania, USA: Elsevier: 120 - 163.
The Applied Nutrition Programme, University of Nairobi.	(1999). <i>Monitoring and Evaluation of Nutrition and Nutrition-Related Programmes. A Training Manual for Programme Managers and Implementers</i> . University of Nairobi & the School of Nutrition, Science and Policy, Tufts University, Nairobi: 1.15 - 1. 30.
Cervinkas, J. & Houston, R.	(1998). Ch 2 - Monitoring: A Tool for Decision-Making. <i>Monitoring Vitamin A Programs</i> . Ottawa, Canada: The Micronutrient Initiative: 1 - 8.
Cervinkas, J. & Houston, R.	(1998). Ch 4 - Supplementation Programs. <i>Monitoring Vitamin A Programs</i> . Ottawa, Canada: The Micronutrient Initiative: 1 - 13.
Cervinkas, J. & Houston, R.	(1998). Ch 5 - Dietary Improvement Programs. <i>Monitoring Vitamin A Programs</i> . Ottawa, Canada: The Micronutrient Initiative: 1 - 13.
Deitchler, M., Mason, J., Mathys, E., Winichagoon, P. & Tuazon, M. A.	(2004a). Lessons from Successful Micronutrient Programs, Part I: Program Initiation. <i>Food and Nutrition Bulletin</i> , Special Edition, 25(1): 5 - 29.
Deitchler, M., Mason, J., Mathys, E., Winichagoon, P. & Tuazon, M. A.	(2004b). Lessons from Successful Micronutrient Programs, Part II: Program Implementation. <i>Food and Nutrition Bulletin</i> , Special Edition, 25(1): 30 - 52.
Department of Health	(1998). <i>South African Demographic and Health Survey data</i> . [Online]. Available: http://www.mrc.ac.za/bod/surveyfindings.htm or www.sahealthinfo.org.za/publications/demographic.htm . 6 - 12.
Dibley, M. J.	(2001). Ch 31 - Zinc. In B. A. Bowman & R. M. Russel, (eds). <i>Present Knowledge in Nutrition</i> . 8 th Ed. Washington, DC: ILSI Press: 329 - 343.
FAO & ILSI	(1997). <i>Preventing Micronutrient Malnutrition: A Guide to Food-based Approaches. A Manual for Policy Makers and Programme Planners</i> . Washington, DC: ILSI Press: 1 - 106. [Online], Available: // www.fao.org/
Feuerstein, M.	(1986). Ch 1 - Understanding Evaluation. In <i>Partners in Evaluation: Evaluating Development and Community Programmes with Participants</i> . London: Macmillan: 1 - 7.
Feuerstein, M.	(1986). Ch 2 - Planning and Organising Resources. In <i>Partners in Evaluation: Evaluating Development and Community Programmes with Participants</i> . London: Macmillan: 23 - 28.
Gallagher, M. L.	(2004). Ch 4 - Vitamins. In L. K. Mahan & S. Escott-Stump. (eds). <i>Krause's Food, Nutrition & Diet Therapy</i> . 11 th Edition. Pennsylvania, USA: Elsevier: 75 - 119.
Helen Keller International, Cambodia	(Jan 2000). Vitamin A Capsule Distribution after NIDS - Lessons Learned from Cambodia. <i>Cambodia Nutrition Bulletin</i> , 1(2): 9 - 11.

Author/s	Reference Details
Helen Keller International, Cambodia	(Dec 2000). Routine Immunization Outreach is a Good Strategy for Delivering Vitamin A Capsules to Cambodian Children. <i>Cambodia Nutrition Bulletin</i> , 2(3): 9 - 11.
Helen Keller International, Bangladesh	(April 2002). Eggs are Rarely Eaten in Rural Bangladesh: Why and How to Improve their Availability. <i>Nutritional Surveillance Project Bulletin</i> , 11. Dhaka: HKI. [Online], Available: //http/ www.hkiasiapacific.org : 4 pages.
Helen Keller International, Bangladesh	(Sept 2003). HKI's Homestead Food Production Program Sustainably Improves Livelihoods of Households in Rural Bangladesh. <i>Homestead Food Production Bulletin</i> , 1. Dhaka: HKI. [Online], Available: //http/ www.hkiasiapacific.org : 4 pages.
Helen Keller International, Bangladesh	(June 2004). Vitamin A Capsule Distribution among 6-11 Month Old Infants: More than 25% Not Covered. <i>Nutritional Surveillance Project Bulletin</i> , 15: 4 pages.
Helen Keller International, Bangladesh	(Nov 2004). Homestead Food Production Improves Household Food and Nutrition Security . <i>Homestead Food Production Bulletin</i> , 2. Dhaka: HKI. [Online], Available: //http/ www.hkiasiapacific.org : 4 pages.
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Institute of Medicine. Food and Nutrition Board.	Dietary Reference Intakes (DRIs). <i>Recommended Intakes for Individuals of Vitamins and Minerals</i> . Washington DC: National Academy Press. [Online], Available: //http/ http://www.nap.edu/books/0309069351/html/21.html [2 pages]
Jonsson, U.	(1995). Towards an Improved Strategy for Nutrition Surveillance. <i>Food and Nutrition Bulletin</i> , 16(2): 102 - 111.
Lailou, A., Monvois, C. & Berger, J.	(2003). Bisavit-A: An Innovative Solution to Combat Micronutrient Deficiency in Vietnam. <i>Sight and Life Newsletter</i> , 3/2003: 3 - 7.
Maberly, G. F., Trowbridge, F. L., Yip, R., Sullivan, K. M. & West, C. E.	(1994). Programs Against Micronutrient Malnutrition: Ending Hidden Hunger. <i>Annual Review of Public Health</i> , 15: 277 - 301.
Mason, J., Deitchler, M., Mathys, E., Winichagoon, P. & Tuazon, M. A.	(2004). Lessons from Successful Micronutrient Programs, Part III: Program Impact (Vitamin A). <i>Food and Nutrition Bulletin</i> , Special Edition, 25(1): 53 - 67.
Reis, T. K., Seidel, R. E., Sudaryono, S. & Palmer, A.	(1996). The Use of Integrated Media for Promotion of Vitamin A Capsule Consumption in Central Java, Indonesia. In R. E. Seidel (Ed). <i>Strategies for Promoting Vitamin A Production, Consumption and Supplementation: Four Case Studies</i> . Washington, DC: AED, USAID: 44 - 55.
Rossi, P. H. & Freeman, H. E.	(1993). Ch 4 - Program Monitoring for Evaluation and Management. In <i>Evaluation: A Systematic Approach</i> . Newbury Park, Ca: Sage Publications: 163 - 213.
Schelling, E. & Zinsstag, J.	(2003). Livestock Milk as an Important Source of Vitamin A for Nomadic Pastoralists of Chad. <i>Sight & Life Newsletter</i> , 1/2003: 35 - 39.

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Solomons, N. W.	(2001). Ch 12 - Vitamin A and Carotenoids. In B. A. Bowman & R. M. Russel, (eds). <i>Present Knowledge in Nutrition</i> . 8 th Ed. Washington, DC: ILSI Press: 127 - 143.
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UNICEF	(1998). Ch 1 - Malnutrition: Causes, Consequences and Solutions. In Bellamy, C. <i>The State of the World's Children 1998</i> . Oxford University Press for UNICEF, New York: 7 - 35.
van het Hof, K. H., West, C. E., Weststrate, J. A. & Hautvast, J. G. A. J.	(2000). Dietary Factors that Affect the Bioavailability of Carotenoids. <i>The Journal of Nutrition</i> , 130(3): 503 - 506.
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WHO/FAO	(2004). Recommended Nutrient Intakes. <i>Vitamin and Mineral Requirements in Human Nutrition</i> . 2nd edition. Rome: WHO: 338 - 341.
Witten, C., Jooste, P., Sanders, D. & Chopra, M.	(2004). Micronutrient Programs in South Africa - South Africa Case Study. <i>Food and Nutrition Bulletin</i> , 25(1). 7 - 17. [Online], Available: //www.inffoundation.org/
Yip, R.	(2001). Iron. In B. A. Bowman & R. M. Russel, (eds). <i>Present Knowledge in Nutrition</i> . 8 th Ed. Washington, DC: ILSI Press: 311 - 328.