



## Graduate Level Training in Nutrition: An Integrated Model for Capacity Building- A National Report

**\*Robabeh SHEIKHOESLAM<sup>1</sup>, Hossein GHASSEMI<sup>1</sup>, Osman GALAL<sup>2</sup>, Abolghassem DJAZAYERY<sup>3</sup>, Nasrin OMIDVAR<sup>4</sup>, Issa NOURMOHAMMADI<sup>5</sup>, Ma. Antonia G. TUAZON<sup>6</sup>**

1. *Section of Nutrition, Ministry of Health and Medical Education, Tebran, Iran*

2. *UCLA School of Public Health, Los Angeles, California, USA*

3. *Dept. of Community Nutrition, School of Nutritional Sciences and Dietetics, Tebran University of Medical Sciences, Tebran, Iran*

4. *Dept. of Community Nutrition, Faculty of Nutrition and Food Technology, Shahid Beheshti University of Medical Sciences (SBUMS), Tebran, Iran*

5. *Dept. of Biochemistry, Faculty of Paramedics, Iran University of Medical Sciences (IUMS), Tebran, Iran*

6. *Dept. of Nutrition Sciences, University of Philippines at Los Banos (UPLB), Los Banos, Philippines*

**\*Corresponding Author:** Email: [i\\_shey@yahoo.com](mailto:i_shey@yahoo.com)

(Received 16 Dec 2014; accepted 18 Feb 2015)

### Abstract

Iran has been active in human nutrition training for the past five decades, but the existing curricular programs do not equip the graduates with the knowledge and skills required for solving food security and nutritional problems of the country. Given this, the Nutrition Department (ND) of Iran's Ministry of Health and Medical Education (MOHME) initiated a curricular reform to develop responsive graduate programs in key areas of nutrition that fill the existing gaps in nutrition training with the goal of improving nutrition policy-making and program development, implementation and evaluation. ND called for a request for proposals for a project entitled "Graduate Level Training in Nutrition". Specifically, with technical assistance from leading academic institutions in Asia, North America and UK, seven new graduate programs were housed in three separate institutions, but coordinated so that together they form a broad multidisciplinary resource for graduate education and research. These seven-degree programs are MSc and PhD in Molecular/Cellular Nutrition, MSc and PhD in Nutritional Epidemiology, MSc and PhD in Food Policy and Nutrition Intervention, and MSc in Community Nutrition. The programs were prepared in collaboration and active participation of selected faculty members of the three Iranian universities, International Union of Nutritional Sciences and the University of Philippines at Los Baños. The development of these programs was made possible through a loan from the World Bank, under the Second Primary Health and Nutrition Project in the MOHME.

**Keywords:** Nutrition, Graduate Level Training, Iran

### Introduction

Iran is a large middle income country with a population size of about 75 million of whom about 50% are less than 20 years of age (1). The country has demonstrable nutrition-related health prob-

lems spanning the range of under-nutrition, poverty-related food insecurity, micronutrient deficiencies, and diet related chronic diseases of adulthood (2).

Although Iran has been active in human nutrition training for the past five decades both at the undergraduate and graduate levels, newly emerging requirements and recent developments within the national planning and executive agencies have indicated the need to restructure and strengthen ongoing training programs as well as to develop new programs that can address present and future needs.

At present, Iran's academic nutrition community is relatively small and narrowly focused to be able to address adequately the needs. Existing curricular programs do not produce the required range of skills and competencies. Moreover, neither the curricular programs nor the technical expertise of key academic institutions covers the entire spectrum of effective program management and intersectoral participation and involvement. Given this reality, the Nutrition Department (ND) of Iran's Ministry of Health and Medical Education (MOHME) initiated a curricular reform to develop and offer responsive graduate programs in nutrition that will fill the existing gaps in nutrition training and eventually improve nutrition policy-making and program development, implementation and evaluation. ND started this great endeavor with hiring an experienced consultant in Nutrition Education programs to analyze the situation of Nutrition education in Iranian universities. The results of that situation analysis induced ND to call for request for proposals for a project entitled "Graduate Training in Nutrition". The specific task was to provide international consultation with regard to the development of seven new graduate programs, to be housed in three separate institutions, but coordinated so that together they form a broad multidisciplinary resource for graduate education and research. These seven degree programs are 1) MSc and PhD in Molecular/Cellular Nutrition, to be housed in the Iran University of Medical Sciences and Health Services (IUMS); 2) MSc and PhD in Nutritional Epidemiology, to be housed in Tehran University of Medical Sciences and Health Services (TUMS); and 3) MSc and PhD in Food Policy and Nutrition Intervention, and an MSc-level program in Community Nutrition to be housed in Shahid Be-

heshti University of Medical Sciences and Health Services (SBUMS). The programs were prepared with technical assistance of selected faculty members from the three Iranian universities, as well as International Union of Nutritional Sciences (IUNS) and the University of Philippines at Los Baños (UPLB). The development of these programs was made possible through a loan from the International Bank for Reconstruction and Development (World Bank) under the Second Primary Health and Nutrition Project in MOHME.

The overall purpose of the proposed training project was to improve the quality and appropriateness of nutrition knowledge with impact on program and policy, and consequently the nutrition status of the population, consistent with the nutrition and health objectives of the MOHME. This project was expected to provide an opportunity for a rapid and substantial strengthening of the human resource capacity in the field of nutrition in Iran.

### *Background*

Over the last three decades, Iran has established an extensive Primary Health Care network and as a result, infant and child (under 5 years of age) mortality rates have fallen significantly (from 122/1000 and 191/1000 respectively in 1970, to 15.3/1000 and 22.5/1000 respectively in 2010) (3), and life expectancy from birth has risen considerably (71.6 years) (3). Over 98% of the population has access to health services and 97% of births are attended by trained health staff (4).

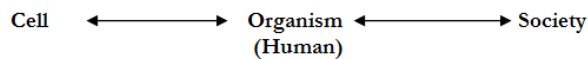
However, in spite of the effective and efficient delivery of preventive and curative health services and a relatively educated population, problems of malnutrition persist. Iran's most important nutritional problems include (a) anemia and micronutrient deficiencies, (b) chronic and some acute malnutrition in young children, (c) poverty related food insecurity in a significant portion of the population, and (d) rapidly emerging problems of obesity and nutrition related chronic disease, particularly in urban areas. Overweight and obesity are also on the rise in adults. The realization of human potential and national economic develop-

ment is constrained by these nutritional problems (2).

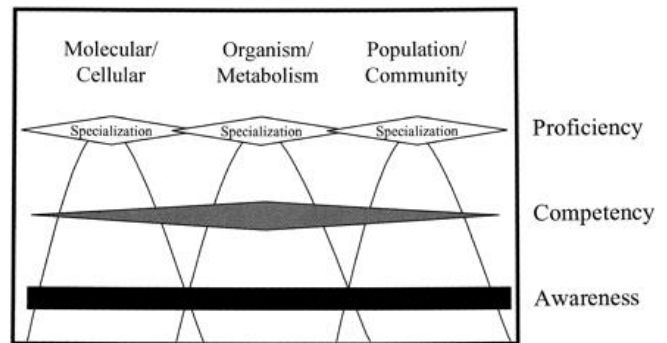
Beginning in the mid-1990s, efforts to address the challenge of improving the nutritional situation in Iran developed within both the Ministry of Health and Medical Education (MOHME) and the community of nutrition scientists and professionals in Iran. Iran's Management and Planning Organization (MPO) invested in a systematic review of the nutrition and food security situation in Iran (the "MABA" project), which was completed in 1998. The MABA project identified a need for coordinated efforts to develop enhanced human resource capacity in nutrition and food sciences capable of solving nutrition problems in the country (5).

A great deal of planning and thoughtful review preceded the present work, in which the needs of the country have been related to the current situation of graduate-level education in nutrition. The general plan of work and underlying concepts of the graduate level training as envisaged by the MOHME were structured around an integrative educational model. In this model, three elements are critical:

- a) The scope of training covers a wide spectrum or continuum termed as "cell to society" (Figure 1)
- b) Training and research on such a broad scope is to be provided by an interdisciplinary umbrella that often includes more than ten or fifteen specialties.
- c) A broad awareness of the breadth of nutrition combined with a specialization in one specific area on the continuum is essential. In other words, awareness covers the entire continuum and specialization is centered in one area such as cellular, organism or society.



The current graduate training programs in Iran offer the broad awareness combined with specialization at the organism level only. Inherent in this modern concept is an integrative approach, interfacing between disciplines and numerous specializations. A cell-to-society model that underlies several of the best-regarded graduate education programs in nutritional science internationally formed the basis for the present program. The integrative "cell to society" concept is best characterized in the graduate education policy statement, Division of Nutritional Sciences of Cornell University (Fig. 1) (6).



**Fig. 1:** Recommended Knowledge Base for Integrative Doctoral Nutrition Training (Adapted from the Graduate Education Policy Statement, Division of Nutritional Sciences, Cornell University, 1991)

Many of the advanced nutrition-training programs in the world show a clear trend in moving towards this concept. In this context and in more advanced models of training, the products of interdisciplinary interfacing are found in (a) clinical nutrition (b) nutrition epidemiology (c) nutrition economics (d) nutrition anthropology (e) food economics and (f) cellular/molecular nutrition. Furthermore, the programmatic modeling after this concept is often seen in the form of some, or all, of the following specialized degree programs in a university setting: (a) cellular/molecular nutrition; (b) human nutrition; (c) clinical nutrition/dietetics; (d) nutrition epidemiology; (e) community nutrition; (f) food policy and nutrition intervention; (g) nutrition communication and behavior change; (h) food, population and nutrition; and (i) international nutrition.

Given the overall situation in Iran and the modern concepts and current trends in nutrition training in the world, the immediate objective is to strengthen and expand the Iranian graduate level nutrition training programs based on national priorities and in line with the modern concepts and methods.

In pursuit of such objectives, the plan of work consisted of:

- i. Designing a program package for graduate level nutrition training in Iran
- ii. Identifying in detail the minimum institution building measures necessary for operating the program package.
- iii. Designing a technical and financial assistance plan for the initial phase of implementation.

## Work Plan and Methodology

For implementing the project, two international consultancy teams were selected through Quality Cost Based Selection (QCBS) process, according to the regulations of the World Bank. They were from University of Philippines at Los Banos (UPLB), which cooperated with SBUMS, and International Union of Nutritional Sciences (IUNS), which worked with both TUMS and IUMS. The two teams had a wealth of teaching and research experience in food and nutrition, with broad understanding of nutrition and nutrition-related issues, as well as specific expertise in their own sub-fields. All the team members were experienced in the development, implementation and evaluation of graduate academic programs at the doctoral and postdoctoral levels. They also had experience in mentoring graduate students and junior academicians in nutrition and nutrition-related fields and had demonstrated ability to work in a multi-disciplinary environment.

After the contracts were signed in 2004, project orientation and inception meetings took place in January and February 2005 in Iran followed by the drawing up of consultants' terms of reference. Thereafter a work plan and period for action was

developed which included five main phases, as follows:

1. Situational Analysis
2. Developing Vision and Mission
3. Designing Curriculums
4. Providing Three-year Start-up Plan
5. Providing Ten-year Plan.

Producing the reports of the above-mentioned phases involved each consultancy team making at least eight visits to Iran in order to consult with Iranian colleagues, collect information, hold stakeholders workshops, etc. Meanwhile, the two consultancy teams conducted joint meetings from time to time in order to review progress and joint activities. There was also a need for coordinated teamwork and delegation of activities between team members, and for consistent consultation between principal investigators and team leaders. For each report, different methods of data collection and analysis were used.

### *Situational Analysis*

The situational analysis focused on the current food and nutrition situation in Iran and the current policy and planning process. It went on to provide an overview of the higher educational system in Iran as well as detailing current graduate programs in food and nutrition related disciplines. The rationale and need for graduate level training in the new areas was provided and the implications of developing new graduate programs on the food and nutrition situation were reviewed. Finally, an assessment was carried out on the capacity of the three Iranian Universities to implement the new programs.

### *Vision and Mission*

It was concluded that over the next 10 years, the vision is to reach a situation that Iranian academicians will have the capacity for in-depth nutrition problem solving and to extend the frontiers of nutritional science at the service of the people. The vision also recognized the need for:

- a) the infrastructure to accomplish the foregoing in the form of a virtual graduate school of nutrition involving IUMS,

TUMS, and SBUMS that is a center of excellence with a strong voice in food and nutrition policy making and showing leadership in the region;

- b) close, two-way interactive links among research, graduate education and program and policy development; and
- c) a critical mass of nutrition scientists and scientists trained in other disciplines that devote their work to the nutrition agenda.

The mission is to create training programs to improve national capacity in research and practice related to food and nutrition sciences, providing constant generation of new ideas into the related nutritional sciences in the “cell to society” concept. These values should be based on international norms in general and current Iranian tenets in particular, respect for human dignity, Equity, Efficiency, Integrity, Transparency, Responsible governance, Self-reliance and Self-esteem, Community service, Conservation of national patrimony and Ethics.

### ***Curriculum Design and Development***

Curricula for seven new graduate programs were developed covering MSc and PhD in Food and Nutrition Policy, MSc in Community Nutrition, MSc and PhD in Nutritional Epidemiology and MSc and PhD in Cellular/Molecular Nutrition. The uniqueness of these programs is that they are interdisciplinary with common core courses (maximum 6 units) at both MSc and PhD levels.

For each course, detailed information was provided covering the name of the course, the prerequisites, the number of units, type of course, goals and objectives of the course, course description and topics to be covered and essential references. Consideration was also given to the facilities required to run these courses.

### ***Three-Year Start-Up Plan***

The Three-Year start-up plan covered all aspects of hiring local new Iranian Faculty staff and assistants, developing the course material to run the new MSc and PhD programs, and provision of new facilities, services and equipment. It also included necessary training of Faculty staff to run

the new courses and conduct research and the hiring of international collaborators (partners appointed as visiting professors) to help in design and running of the new programs and in the planning, design and implementation of the interdisciplinary research programs.

### ***Ten-Year Plan***

The ten-year institutional development plan is envisioned as a natural follow-up of the initial activities contained in the three-year plan and focused on development activities related to faculty development and recruitment, preparation of course materials at the MSc level, international collaboration, physical facilities, space requirements and research.

On the other hand, the ten-year institutional plan is centered on development activities targeting faculty development and teaching towards the PhD programs, maximizing interdisciplinary research, enhancement of institutional development and capacity building, and promoting Iranian universities in their regional role as well as towards their development as Premier Institutions. The key areas in years 4 to 10 are faculty development and capacity building for independent and collaborative research, management structure, development of teaching material and physical facilities and other services.

## **Discussion**

### ***Rationale for adopting an Integrated Curriculum Model***

The current graduate program in human nutrition, plus the programs proposed here, can be structured to provide an integrated set of offerings, ultimately producing a cadre of professionals who can act as a team working together in an interdisciplinary and intersectoral manner. The expected integrative approach will facilitate the interfacing between disciplines and the specializations that are listed in the curricula of the newly PhD and MSc programs in addition to the MPH and PhD in Nutritional Sciences that are at present offered at several Iranian universities. The outcome of inte-



grating the four curricula will ensure the implementation of the concept of the cell-to-society model.

To ensure that the new Iranian advanced nutrition-training programs are progressing towards their goals, they should show clear trends in moving towards this concept. The programmatic modeling after this concept is often seen in the form of some, or all, of the following specialized degree programs (a) cellular/molecular nutrition (b) nutrition epidemiology (c) nutritional sciences (d) community nutrition and (f) food and nutrition policy, in addition to the present programs in human nutrition. The ultimate aim of the present design of the integrated educational model across the cell to society spectrum is to develop a broad theoretical and practical knowledge base as well as a team of experts who can together [a] establish an epidemiological as well as a social diagnosis of malnutrition in the community concerned with special focus on predictive risk factors and pathways, [b] include economists that use their skills and tools to target nutrition policy, and [c] both "a" and "b" above will effectively apply their intervention tools of biomedical, social, and/or economic nature in prevention and control of malnutrition.

The present design has a special focus on building a team of experts that can work in harmony together rather than a group of individual experts. There is a need for a common knowledge base, which allows them to understand each other and a set of common skills that helps them to work together within the triad of teaching, research and policy and program work. That is the aim of our proposed integrative process.

The expected outcome of the integrated educational model is that we will have highly specialized experts from various disciplines who can understand malnutrition, have a common language and most important of all, can work together. They will acquire skills for predictive risk factor capabilities and use appropriate tools to explore social and biological pathways to genesis of malnutrition and its interaction with the environment. They will also acquire skills analysis, design and management of nutrition interventions and programs.

### *The Integration Process*

The proposed curricula combine traditional academic course work with practical training, so that graduate students acquire an in-depth knowledge in general nutrition, nutritional biochemistry and physiology, biostatistics and epidemiology. They develop an understanding of how to design and conduct nutrition research studies, and gain hands-on experience in essential techniques in data analysis and presentation. Students take most of their academic courses at three levels; level of awareness, level of competency and level of proficiency. Additional courses in an advanced program could be available by cross listing in any of the Iranian Universities.

The nutrition core provides students with an understanding of basic and applied nutrition, biostatistics, and nutrition science policy. Basic courses in economics and other relevant social science are also part of the core. Courses in these areas reflect the broad science and policy mission of the school. Students entering with an appropriate master's degree may submit requests to waive individual courses or to take exemption exams. A paper writing course which is about turning data into a suitable and publishable manuscript meeting peer review standards is proposed as obligatory for all graduate training programs. A Food and Nutrition Security Course, education in the process for setting recommendations and perhaps an update on current nutrient recommendations (WHO and a few countries such as US or EU countries) should be included. In addition, nutritionally related diseases and their social costs is a course of choice for all. This would serve the purpose of reviewing all diseases related to nutrition, the preventive potential of each and the estimation of total direct and indirect costs of the diseases. Investigating under nutrition, a problem-based approach would benefit from the inclusion of a field project.

This structure would insure that the program students co-mingle and are equal in education to the other PhD students in the department, that they have exposure outside of the home department, and that they share 100% the courses that are core

for all nutritional programs irrespective of their department.

### ***Creation of a Center of Excellence***

In the end, an inter-university Center of Excellence in Nutrition will be established whose foundation would be based on sustained international collaborations. A program of international collaboration is expected to help the various faculty and particularly the young investigators in developing new knowledge, skills and experience in the areas of research design and management (particularly large scale interdisciplinary projects), networking, mentoring, teaching, nurturing research culture, promotion of interdisciplinary work, spirit of teamwork and leadership and innovation. The potential for the formation of a Center of Excellence in Nutrition will not be tangible if the three universities do not collaborate in the implementation of the several new nutritional programs. The opportunity for positive impact on science and on the health of the Iranian population, as well as for influence in the region, is significant. The proposed program and its component parts cannot be effectively mounted on the scale required by any one of the participating institutions, but working together and with the international community a great deal can be accomplished. It is pertinent that the programs' activities begin immediately since many local and international professionals and organizations find it a necessity to address the current nutrition situation in Iran

### ***Activities for using the results of the project***

Change of Iran's government in middle 2005 and as a result, broad changes among the senior managers of MOHME, made serious difficulties for the administrators of the project, especially in justifying the new managers who had different priorities in their minds and no idea about the importance and the administrative requirements of this project. After an almost long delay resulted from the mentioned changes, some developments have been recently made in enforcing the results of the project and starting the newly designed graduate Nutrition programs through the hard

efforts of the administrators and co-ordinations of the scientific board of Nutrition and undersecretary of educational affairs of Iran's MOHME. Fortunately, the new seven Nutrition degree programs are now under the approval process and it is hoped that they can be started at the three selected Iranian universities in the near future.

### **Ethical considerations**

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

### **Acknowledgments**

The authors would like to acknowledge all of those who kindly helped in implementing this project, especially Dr. Masoud Pezeshkian, the Minister of Health and Medical Education of that time, his deputies for Health (Dr. Mohammad Esmail Akbari) and Education (Dr. Abdollah Karimi and Dr. Mohaqeqqi) affairs, Dr. Hosseyn Keshavarz, and other related managers of MOHME, and also the following people who played important roles in implementing the project. We hope their efforts can be led to training skillful nutritionists, competent in solving nutritional and health problems of the community. The authors declare that there is no conflict of interests.

### ***International contributors***

- **International Union of Nutritional Sciences (IUNS):**  
Dr. Ibrahim Elmadfa (Austria), Dr. Mamdouh Gabr (Egypt), Dr. Gail Harrison (USA), Dr. Claus Leitzmann (Germany), Dr. Barrie Margetts (UK), Dr. Geoffrey Marks (Australia), Dr. C. G. Nicholas Mascie-Taylor (UK), Dr. Anura Parkad (India), Dr. Mark Wahlqvist (Australia)
- **University of Philippines at Los Banos**

**(UPLB):**

Dr. Corazon V.C. Barba, Dr. Angelina Bustos, Dr. Wilfredo B. Carada, Dr. Aleli Elizabeth E. Gana, Dr. Ma. Theresa M. Talavera

**Iranian contributors**

• **Iran University of Medical Sciences (IUMS):**

Dr. Shahryar Eghtesadi, Dr. Mohammad Farajollahi, Dr. Ali Samadi Kuchaksaraei

• **Shahid Beheshti University of Medical Sciences (SBUMS):**

Mrs. Azadeh Aminpour, Dr. Nasser Kalantari, Dr. Zahra Kargar-novin, Dr. Shiva Mehran, Dr. Arash Rashidi, Dr. Farideh Tahbaz

• **Tehran University of Medical Sciences (TUMS):**

Dr. Fereydoun Siassi, Dr. Kazem Dr. Mohammad, Dr. Ahmad-Reza Dorosty Motlagh, Dr. Akbar Fotouhi, Dr. Kouros Holakouie Naieni, Dr. Haleh Sadrzadeh Yeganeh

**References**

1. Presidential foundation; Undersecretary of Strategic Planning and Supervision; Iranian Center of Statistics; Results of National Consensus, 2011.
2. Ghassemi H, Harrison G, Mohammad K (2002). An accelerated nutrition transition in Iran. *Public Health Nutrition*, 5:149-55.
3. Rashidian A. Iran's National Health Observatory; First Report: Multiple Indicator Demographic and Health Survey, 2010.
4. World Health Organization; Report on Iran's Statistical Health Indicators; [http://www.whoiran.org/Country\\_Profile\\_Iran\\_FA.html](http://www.whoiran.org/Country_Profile_Iran_FA.html)
5. Ghassemi. H, Omidvar. N; Food and Nutrition Security, Studies for Planning and Implementation; National Nutrition and Food Technology Research Institute, Management and Planning Organization, UNICEF; 1998.
6. Graduate education policy statement, division of nutritional sciences, Cornell University; 1991.