Handbook

INTRODUCTION TO NUTRITIONAL ANTHROPOLOGY

Editors:
Judhiastuty Februhartanty
Andi Mariyasari Septiari

South East Asian Ministers of Education Organization
Tropical Medicine and Public Health
Regional Center for Community Nutrition
(SEAMEO – TROPMED RCCN)
University of Indonesia
Jakarta
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FOREWORD

SEAMEO-TROPMED Regional Center for Community Nutrition (RCCN) University of Indonesia has conducted teaching, training and research since 1970, to provide the region with the manpower, equipped with knowledge and skill in nutrition. Trainings offered include degree (master and doctorate) as well as non degree programs. Since the past few years, the degree training programs are coordinated under the auspice of the Faculty of Medicine, University of Indonesia.

Nutrition is a multidiscipline school of work. People say…"*You are what you eat*". It is indeed true since what we eat shapes what we are now physiologically. However, it is interesting to note that how the food comes to our mouth is mostly governed by social, economic, political, and cultural processes. This is why nutrition is called as *biocultural issue par excellence* because it combines the study of culture and biology.

Therefore, on behalf of SEAMEO-TROPMED RCCN, I put high enthusiasm that the handbook of "Introduction to Nutritional Anthropology" is finally completed with the purpose of enriching our present understanding about nutrition, its problems and potential solutions.

At the same time, I would like to sincerely thank to the team and contributors who have worked so intensively to bring this handbook to reality.

I trust that each of the readers, especially the students, will find this handbook useful and beneficial to them as well as to their organizations.

Director,

Dr. dr. Ratna Sitompul, SpM(K)

PREFACE

An anthropological perspective includes both the biological and cultural aspects of nutrition - how nutrition can affect human behavior and culture and conversely, how culture and human behavior can affect nutrition. Additionally, nutritional anthropology includes the study of cross-cultural variation in diet, nutritional status and subsistence systems as well as variation in these factors over the evolutionary course of human existence, from prehistoric and historic to modern times.

This course is designed as an introduction to the field of nutritional anthropology, and to provide the participants with some basis for assessing the reliability and feasibility of nutritional advice and policy encountered in everyday of modern life.

The overall aim is to familiarize the participant with theory, concepts and methodologies for investigating anthropological aspects of community and human nutrition.

The course on Nutritional Anthropology (used to be Socio-Cultural Aspect of Nutrition, then the Anthropology of Food) has long been the obligatory course of Master Training Program at the SEAMEO-TROPMED Regional Center for Community Nutrition. Understanding that nutrition is also affected by socio-cultural aspects of a community, the course was initially combined with Introduction to Qualitative Research since 2006 with the aim to provide basic concepts of nutritional anthropology and at the same time introducing the methods in the field.

Since then, the course of Introduction to Nutritional Anthropology is part of the training program attracting Master students as well as short course participants from government and non government organizations as well as some academic institution from the regions.

This handbook is developed based upon the existing curriculum used in the course of Introduction to Nutritional Anthropology with some expansion in some of the chapters based on the teaching and learning experiences in the class. The handbook is presented in three parts i.e. foundation of nutritional anthropology, socio-cultural aspects of nutrition, and methods in the field of nutritional anthropological studies. Within each chapter, case study and learning activities are provided for enhancing clarity and stimulating further thinking/discussion.

Finally, we are fully aware that this handbook is just an initial work which needs continuous inputs for improvement. Therefore, we invite comments and suggestions for making the handbook more useful to any relevant professionals in the field of work.

Jakarta, September 2009

Judhiastuty Februhartanty
Andi Mariyasari Septiari

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This handbook is a result for an intense collaborative work. First and foremost, we thank the Government of Indonesia through the Ministry of National Education for the funding support. We are grateful for the supportive guidance from our Director DR. Ratna Sitompul, MD, SpM(K) and the Chief Operating Officer Endang L. Achadi, MD, MPH, DrPH.

We also indebted to all contributors who each has played a very significant role in the development and review of this handbook. They are Airin Roshita (lecturer at SEAMEO-TROPMED RCCN), Umi Fahmida (lecturer at SEAMEO-TROPMED RCCN), Duma O. Fransisca (individual consultant working in the field of nutrition and health), Achmad Fedyani Saifuddin (professor of anthropology, Department of Anthropology, Faculty of Social and Political Science, University of Indonesia), Risang Rimbatmaja (researcher who is inspirational in the use of qualitative and other research methods), and last but not least our external consultant Anita V. Shankar (medical anthropologist of Johns Hopkins University, Boston, USA).

We would like also to thank our colleagues who have worked "behind the scene" for this handbook development, especially to Rindrawati for format editing and Achmad Tjatju Djayanto for layout setting. A sincere gratitude is also addressed to the Finance Team (Pak Budhi, Pak Jatmiko, Monic, Iyut, Relita et al) who has managed to arrange all administrative work for the financial matters.

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PART 1

FOUNDATION OF NUTRITIONAL ANTHROPOLOGY

CHAPTER 1

Introduction to Nutritional Anthropology

Judhiastuty Februhartanty and Duma Octavia Fransisca

Objectives:

1. To introduce the relevance of integrating nutrition and anthropology as it pertains to cultures and diets.
2. To explore nutritional anthropology and its consequences on human's nutrition and health in diverse and changing environments.
3. To discuss why nutrition has been described as a "bicultural issue par excellence."

1. Introduction

Human culture, the focus of anthropological studies, may be defined compositely as the sum total of a group's learned and shared behavior. This phenomenon of consistent transmittal, the sharing of experience through time, is apparently unique to our species and is also a basic type of positively reinforcing social behavior. From it arouse the possibility for individuals and cultures to adapt to the natural environment and to begin the process of change and development some scholars have termed "cultural evolution".

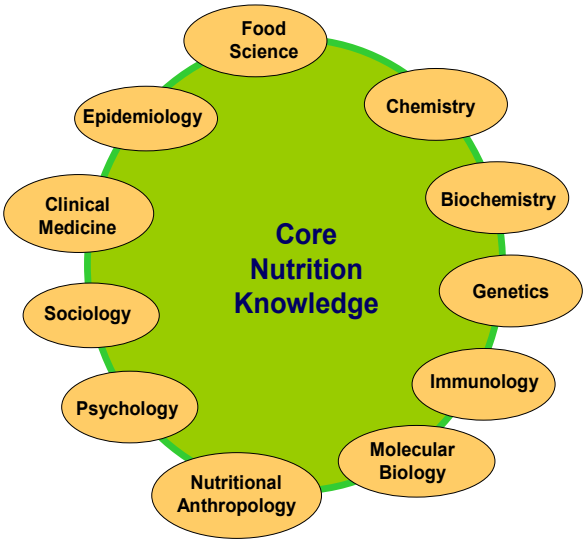


Figure 1.1. Contributions to nutrition knowledge

Human diets and food use have always been subjects important to anthropologists. Over the past several decades interest in these topics has grown into an area of research referred to as nutritional anthropology that crosscuts cultural, archaeological, and biological anthropology. In other words, human's nutritional behavior has generally been studied from three main points of view, i.e. physiological, psychological and socio-cultural (de Garine, 1972).

It has only been through recent scientific advances that individual foods and food combinations have been examined in terms of specific nutrient categories i.e. energy, fat, protein, vitamins and minerals. Major questions remain as to how people select diets that are conducive to ongoing nutrition and good health, particularly in changing nutritional environments and the dietary prospects for the future (Messer, 1984). Therefore, at the heart of much research in applied human nutrition and nutritional anthropology is the matter of food intake. Food is, after all, the carrier for most nutrients consumed by humans.

Nutritional anthropology is an integration of two primary disciplines (Freedman, 1977).

- Nutrition – a field of knowledge concerned with the effects of food upon individual biochemical and behavioral equilibrium
- Anthropology – seeks to understand the laws governing the relationship of individuals with each other and to the culture they have developed, as well as to explain processes which have evolved to satisfy basic physiological and psychological needs (how and why cultures develop)

  Nutritional anthropology, therefore, examines the – relationships of nutrition to socio-cultural, economic, and ecological processes to identify solutions to specific human problems

Applied nutritional anthropology may be defined, in one sense, as the application of anthropological data and methods to address the cultural aspects of human nutritional problems, or as the study of the interrelationship between diet and culture and their mutual influence upon one another (Freedman, 1977).

Nutritional problems may be of deficiency or of excess; may derive from inborn errors of metabolism or from cultural and/or environmental factors. Nutritional problems may require direct treatment of the individual, or direct or indirect change in the micro – or macro-social and/or natural environments. Regardless of circumstances, however, the solution will almost always require some modification of a cultural habit.

Counihan and van Esterik in 1997 classify nutritional anthropologists into the following main categories:

1) sociocultural processes and nutrition.
2) social epidemiology of nutrition.
3) cultural and ideational systems and nutrition.
4) physiological adaptation, population genetics, and nutrition.
5) applied research for nutrition programs .

The examination of sociocultural processes and nutrition are often focused on large-scale processes of change, such as globalization, modernization, urbanization, changing women's roles, and technological change in order to understand how these

processes affect food and nutrition. For example, this would include information on how cash cropping has affected local diets in developing economies.

(a)

Figure 1.2. Typical Aboriginal food stuffs

(b)

Figure 1.3. A tray full of cereals, bean and block sugar conveyed to the guests after finishing a meal at an Indian restaurant

Social epidemiology and nutrition includes a range of topics describing how particular social and cultural factors place people at risk for nutritional problems or identifying health problems related to nutrition. In recent years there has been increased attention to the social and ecological determinants of micronutrient deficiencies, such as vitamin A with particular emphasis on socioeconomic and cultural factors that adversely affect growth in infants and young children.

Another area of nutritional anthropology includes examination of cultural and ideational systems and nutrition aimed at understanding how particular beliefs relate to food selection, including food prescriptions and proscriptions. Studies have examined food avoidances during pregnancy or childhood illness and how they affect health outcomes.

Biocultural anthropologists have been interested in the interactions of cultural, physiological, and genetic adaptations in relation to food systems and nutritional patterns. For example, investigation of adaptations that permits people to create and sustain diets that, over the long run, would be harmful without such adaptations. These could include processing of foodstuffs or food combining to enhance overall nutrient absorption. Genetic variability in populations and food consumption patterns has also been a topic of investigation. Anthropologists have tried to understand why in some populations adults can easily consume milk, while many lose their capacity to digest lactose after childhood.

In addition to conducting basic research in the areas described above, some nutritional anthropologists also engage in applied research, which direct supports public health activities. In this area, socio-cultural factors are examined within the context of nutrition interventions in an effort to improve programs and enhance nutrition and health.

Nutritional anthropology research uses methodology from anthropology, epidemiology and nutrition science to examine a broad range of issues related to diet and health.

2. Brief History on Nutritional Anthropology

Freedman (1977) stated that considerable work on dietary habits has been done in other cultures. The review focuses on the history of food consumption survey in Western world which began in the late 1800's. It started with a study by Von Rechenberg in 1890 on the diet of Saxon hand-weavers using questionnaires, direct observation, and interviews. Another study by Goss in 1897 among Spanish-Americans in New Mexico places their food habits into a socio-anthropological perspective. The study includes a nutritional analysis of several low-income diets, and compares this with dietary studies done for other regions of the United States. The ethnography of Native American wild rice gatherers also contains a nutrient analysis and considers the comparative nutritive value of the grain.

Considerable interest in how food consumed shaped individuals in other parts of the world was elaborated by Freedman (1977) using various earlier studies:

- McCarrison in 1928 demonstrated the relative values of Sikh, Pathan, Bengali and other Indian diets by feeding these to laboratory animals and concluded that striking differences in the physique of different Indian ethnicities was due primarily to the biological value of their diets.
- In 1930's the British were focused on trying to understand dietary habits in their colonies as a means of improving overall performance of the workers there. Orr and Gilks in 1931 performed extensive metabolic studies among two East African groups: the Masai (carnivores) and the Akikuyu (vegetarians) and pointed out the relationship between nutritional status and diet and the importance of anthropological factors influencing food intake.
- Richards' study in 1932 and others are generally taken as the beginning of the anthropological study of food habits. She studied the Bemba of Northern Rhodesia, using a functionalist model to illustrate the interrelationship between diet and other cultural institutions. Richards concluded that the reasons natives did not work harder (a primary concern for British mining and other economic interests) was not a question of sloth but of undernutrition.
- Psychological aspects of food: How did early experience with food affect later social relationships?
    a) DuBuois study in Alor in 1941 concludes that a child's early experiences with frustration or neglect related to food resulted in the basic insecurity and distrust as an adult.
    b) Obesity in Puerto Rico (economically better off areas) was linked to fear of hunger from the past.

Furthermore, the development of nutritional anthropology in the United States is pioneered by the work of the National Research Council's Committee on Food Habits. The Council came about as a result of the desire to enhance the overall health and fitness of individuals in the military (circa 1940). At that time many Americans suffered from nutritional deficiencies. Two committees were formed: one focused on biochemical and physiological aspects of diet; one focused on cultural patterns of diet – food habits, including psychology and cultural anthropology. This work was the first coordinated interdisciplinary study of food habits in an industrialized nation. It also included

preliminary standards of collecting basic data on food habits from the perspectives of psychology, anthropology, home economics, psychiatry, and sociology.

To provide better understanding on interaction between human nutrition and its environmental conditions, many researches on nutritional anthropology were conducted. There are a number of approaches and frameworks developed, but only Ecological Framework and Biocultural Approach will be discussed in this chapter.

a. Ecological Framework

Throughout the six million years of human existence, people have found the means of producing adequate, palatable, ecologically adaptive, and ideologically acceptable diets within a vast range of environmental contexts and cultural patterns. As population growth continued to increase, this made increasing food production imperative. Ingenious strategies such as agriculture, animal domestication, and industrial farming have been employed in order to expand food resources.

But today the threat of the Malthusian forecast has raised serious questions about our continued ability to provide enough food for ever-increasing world population. This is not quite accurate though. Because in fact we (the world) have enough food to feed the whole planet and more at this moment. The big problem is getting the food to those people who need it most. With existing food technologies, it is possible to feed an increasing population.

Thus, malnutrition, caused both by global scarcity and pockets of overabundance, is widespread and well known. Efforts to deal with nutritional problems have met with mixed and often disappointing results. However, the failures as well as the successes of food programs have led to an increased understanding of these matters by the public and government and within the scientific community. The issues involved are complex and require a focus that incorporates biological, psychological, social, cultural, and economic factors. More comprehensive models are needed to understand human food systems and to guide food production and food distribution policies and programs.

The model below is based upon an ecological approach to human nutrition and integrates biological, psychological, social, cultural, and economic factors (Jerome et al, 1980).

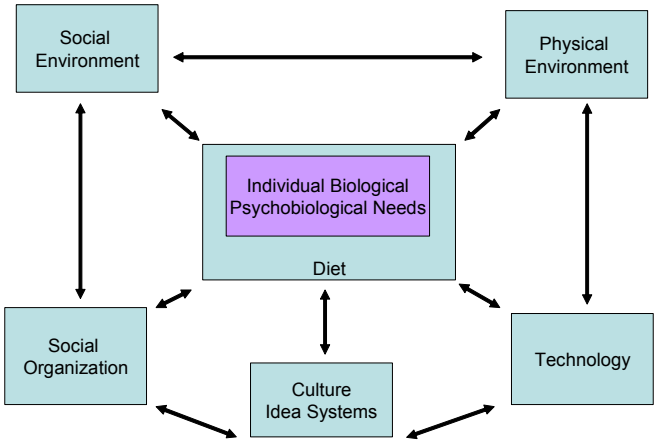


Figure 1.4. An ecological framework for nutritional anthropology
(**Source:** Jerome, Pelto, and Kandel, 1980)

At the center of the diagram are individual biological requirements for nutrients and psychological needs for nurturance which comprise the heart of the system. *Individual requirements* are conditioned not only by generalized species characteristics but also by developmental stage, activity level, reproductive demands, genetic characteristics, and various stress situations throughout the life cycle. Nutrient requirements are satisfied through the ingestion of food, which comprises the diet – the product of a particular food-producing system.

The surrounding boxes, which form part of an open system with the individual, represent the various aspects of a given society's food-producing system. The *physical environment* includes climate, water resources, soil characteristics and related features which establish conditions for production. The broad *social environment* encompasses other societies whose food production and distribution behavior can have profound effects on the society in question. *Social organization* refers to a large set of features, including the economic and political structures related to food production and distribution, division of labor and micro level features of household structure. *Technology* embraces the tools and techniques of food production and distribution, includes agricultural practices, food processing, and transportation systems, domestic storage and food preparation. *Cultural and ideological systems* include ideas about the role of food in health, religious beliefs involving food, food preferences and restrictions, and the use of food in social interactions, among others (Jerome et al, 1980).

The ecological approach is valuable for delineating elements of a dynamic system, determining how the various elements work together, identifying hazards or potential stress areas, predicting types and direction of change, and assessing adaptive and harmful responses to both planned and unplanned change.

b. Bio-cultural Approach

One of the most interesting and visible ways in which men and women express their cultural differences is through the food that they eat or do not eat. Each human being has certain biological needs that must be met by the same nutrients as those required by all other people. Yet the foods that supply these nutrients are as different as the environments in which people exist and the cultures through which people have adapted to their environments (Sanjur, 1980).

A recognized thesis today is that the study of nutrition is a biocultural issue. Pelto and Jerome (1987) have described nutrition as "*the biocultural issue par excellence*" because it combines the study of culture and biology. The consequences of food intake are biological; that is, individual biological functioning is directly and continuously affected by food intake over the course of a lifetime. But the nature of food intake – what people eat, how, when, where, and how much – is heavily influenced by social, economic, political, and cultural processes. From assessment of nutrient distribution at the national level to analysis of nutrient distribution within communities and families, social variables are an integral part of nutritional outcomes.

3. The Future of Nutritional Anthropology

The role which anthropological factors play in determining human food behavior and nutritional status has been well examined; and the effects of ecological variables on food preferences and consumption have been pointed out. Efforts to introduce new foods have shown to meet with favorable or unfavorable responses, depending to a large extent on the degree of understanding of the cultural background of the client group. It is the job of the cultural and social anthropologist to provide the background for the understanding of human behavior necessary to permit desirable social engineering, and that there is good reason to believe that the successful application of nutritional knowledge can be facilitated by close collaboration of nutritionists with specialists in anthropology who have concentrated upon the study of human food habits.

In 1943, the Committee on Food Habits observed that "A new science of food habits is developing. This will be a handmaid to, and of equal importance with, the biochemical science of nutrition in efforts for prevention of diseases and facilitating man's progress towards optimum health" (Freedman, 1977). This prediction was and still is true years after that. The work of public health nutritionists and anthropologists has become more obvious in linking the two disciplines for being able to understand the role of nutrition on the health of the human being.

As reported during one plenary session at the 18th International Congress on Nutrition held in Durban in September 2005, nutrition in the new millennium is regarded as a biological, and also a social and environmental science. Consequently, it is concerned with personal, population, and also planetary health; and so with the human, and also the living and physical worlds. The new nutrition is designed to face and effectively address a continued rising human population, the persistence of malnutrition, the rise of obesity and diabetes in early life, increased inequality within and between nations and populations, rapid changes in global and local food supplies, and the diminution and draining of natural resources. It is proposed that only by combining biological, social, and environmental approaches can nutrition science feasibly and effectively fulfill its potential to preserve, maintain, develop, and sustain life on earth (Cannon and Leitzman, 2006).

Summary

It is necessary to synergize biological, social and environmental approaches in addressing human population, malnutrition, non communicable diseases, food supplies, natural resources problems more effectively.
For example, some nutrition and health problems are not always caused directly by biological or medical issues, but simply because of community cultural and social values, behaviors and perceptions.

Case study:

Nutritional Change in Polela, a Zulu community in South Africa

- The problems: acute malnutrition and rampant infectious diseases
- Poor farming caused soil erosion, thus causing diet lacked in green leafy vegetables
- No stated understanding of link between diet and health
- Program efforts focused on increased consumption of milk and eggs was resisted
- Basic cultural issues:
    a) Only members of the kin group of the head of household could use milk produced by man's cattle
    b) For the married woman, she did not have access to this milk. Also during menses when she was thought to exert evil influences she could not pass the cattle or consume its milk
    c) For eggs: it was uneconomical to eat eggs that would become chickens
    d) Eating eggs were sign of greed
    e) It perceived that young girls eating eggs became lascivious (greed and lust)
- How to overcome these problems to improve nutrition? Based on the above knowledge about people in Polela, the following were attempted:
    a) Reintroducing their indigenous cereal (i.e. millet) which was supplanted over maize introduced by the Europeans. Cassel said "Once facts about 'the olden times' were presented, they were readily accepted by many of the older people."
    b) How to deal with problem of milk? Milk was incorporated in the pregnant or lactating women's diet. But the decision was to introduce powdered milk which did not originate from cows from Zulu community area.
    c) Beliefs related to eating eggs derived from economic reasons not cultural. Therefore, efforts were directed at increasing egg yields so that enough were produced for eating as well as for hatching. The nutritional value and palatability of eggs were emphasized by incorporating eggs into familiar recipes.
    d) Increasing consumption of green vegetables through:
        - Formal practice of eating formerly-eaten wild greens was highlighted
        - Home gardens were encouraged
        - Financial gains from home gardens demonstrated
- Results in 12 years:
    a) IMR – reduced from 276 per 1,000 live births to 96
    b) Pellagra and Kwashiorkor was nearly eliminated

Source: John Cassel in 1955 and 1957 as quoted by Freedman (1977).

Learning Activity 1.1. Pelto and Jerome (1987) have described nutrition as "*the biocultural issue par excellence*" because it combines the study of culture and biology.

Task: Explain a biocultural approach for obesity.

Learning Activity 1.2. Jerome, Pelto, Kandel (1980) explores the ecological framework for nutritional anthropology.

Task: Analyze a situation of famine in a given region using the ecological model

References:

Cannon G and Leitzman C. Nutrition science for the new millennium. Asia Pac J Clin 2006; 15 (1): 2-5.

Counihan C and van Esterik P, eds. Food and Culture: A Reader. New York and London: Routledge, 1997.

de Garine I. The socio-cultural aspects of nutrition. Ecology of Food and Nutrition 1972; 1: 143-163.

Freedman RL. Nutritional anthropology: An overview. In: Fitzgerald TK (ed). Nutrition and anthropology in action. Assen/Amsterdam: van Grocum, 1977.

Jerome NW, Pelto GH, Kandel RF. An ecological approach to nutritional anthropology. In: Jerome NW, Kandel RF, Pelto GH (eds). Nutritional Anthropology: Contemporary approaches to diet and culture. New York: Redgrave Publishing Company, 1980.

Messer E. Anthropological perspectives on diet. Ann Rev Anthropology 1984; 13: 205-249.

Pelto GH and Jerome NW. Intracultural diversity and nutritional anthropology. In: Logan M and Hunt E (eds). Health and the Human Condition: Perspectives on Medical Anthropology. New York: Duxbury Press, 1987.

Sanjur D. Social and cultural perspectives in nutrition. New Jersey: Prentice-Hall, Inc., 1982.

CHAPTER 2

Food and Culture

Andi Mariyasari Septiari and Duma Octavia Fransisca

Objectives:

1. To understand what culture is.
2. To discuss the development of food systems.
3. To discuss the interrelationship between food and culture.
4. To discuss the social function of food.
5. To discuss food avoidance and food taboos.

2.1. Introduction

"Tell me what you eat: I will tell you who you are"
(Brillat-Savarin, 1825)

"You are what you eat"
(Anonymous, German)

Food consumption is a basic component of all human societies. It is an integral part of the culture of a community, religion, and nation. Food is a relative concept. On a global level, it appears that humans eat everything that is not immediately toxic. However, as we look closer at various cultures we find that there is considerable cultural variation in diet. What is considered edible in one culture may not be for another culture. Insects, for instance, are considered edible in several parts of Mexico, tropical Africa and Southeast Asia would be considered appalling by other cultures (den Hartog et al, 2006).

It is important to realize that individual food behavior may differ from what is a generally accepted behavior within a larger population. This brings us to the primary question of what are food habits. Food habits are the ways in which a community chooses, consumes, and makes us of available food in response to social, cultural, health, environmental, and economic pressures (den Hartog et al, 2006). Food habits come into being and are maintained because they are effective, practical and meaningful behaviors in a particular culture (Fieldhouse, 1986).

Analysis of food habits is very useful, for it allows us to see that our own food practices and preferences are quite as exotic and strange, in the eyes of others, as they are in ours. Food is often used as a way of defining one's own group; whether a nation, community or society.

People do not think of food in terms of energy and nutrients. What individuals within a community consume is basically determined by two interrelated factors:

- What foods are available: this is affected by geographical factors such as climate, soil conditions, lowlands, highlands, rural, urban, food production, food processing and transport capacity. This is also affected by socio-economic developments, access to cash for goods, and both long and short term environmental changes.
- Socio-cultural influences on diet: this includes cultural legacy of previous generations. Culture will further determine attitudes toward food regarding what to eat and not to eat, and with whom, where, and when to eat. This is further affected by a community's or household's ability to access to food that will determine an individual's actual food intake.

This chapter will discuss more about how culture can determine human food choice and food habits. A first step is to understand what is meant by culture.

2.2. Culture

Culture may be defined as what makes people similar to some other people and yet different from the vast majority of people in the world. It is a kind of social heritage and could be described as way of life. Tylor in 1871 has defined culture as a complex whole which includes knowledge, belief, art, morals, law, customs, and any other capabilities and habits acquired by man as a member of society. Indeed, it is complex, being the sum total of a group's learned, shared behavior and unique in that it is shared through time (Fieldhouse, 1986).

The terms "culture" and "society" are sometimes used interchangeably; whilst it is true that there can be no culture apart from society, they are nevertheless not the same thing. Culture describes pattern of behavior; society refers to the people who participate in the culture and thus give it concrete expression. In addition, Foster in 1962 (Fieldhouse, 1986) also pointed out that a culture contains symbols that are understood by the group, emphasizes specific activities, and provides for interaction between people in socially acceptable manner.

Foster (1962) explained the characteristics of culture as follow:

- Culture is a *learned experience* acquired by man and not biologically determined. Culture can be modified or unlearned, and transmitted from one generation to the next. It is a group phenomenon, and without socialization processes would not be continued.
- Cultures are constantly changing because it is the product of interactions among cultures, through generations. Culture is not static although it preserves traditions but also builds in mechanism for change. Though the elements of food behavior remain the same, the manner in which they are carried out is modified from generation to generation.
- Every culture also *resists change* by a self generated mechanism to perpetuate its cultural traits and maintain its boundaries. Food habits, although far from fixed, like all fundamental habits, can be resistant to change.

- We are on the whole, *unconscious* of our culture. It is *internalized* so that most of our routine behaviors are done unthinkingly and may even be unaware that there are rules governing many aspects of our behaviors.
- Culture *has a value system*. Amongst the substances accepted as food by a culture, some are labeled good and some bad.

2.3. The Development of Food Systems

a. Hunting and gathering food systems

These food systems may be defined as the absence of deliberate and organized arrangements for long-term food production (e.g. agriculture or husbandry of animals). Hunter-gatherer groups depend primarily on the indigenous food stuffs of their local environment, affording them less control over diet that exists in other types of food systems. Hunter-gatherers tend to be less destructive of their environments than food-producers and have developed numerous cultural mechanisms for maintaining a constant local food supply. Hunting is the focus of economic, socio-religious and ritual activity in the groups. The technology, developed in response to environmental imperatives, was designed for specific type of food acquisition. Effective exploitation of the environment depends on a technological inventory – the bows, arrows, spears, digging sticks, baskets, pottery, and other containers, harpoons, lances, kayaks, knives, drills, and adzes. Reciprocal food distribution was developed to ensure that everyone in the community received food; in the same time it enhanced community relations and promoted the solidarity and cooperation that are so necessary in a marginal environment (Jerome et al, 1980). Economic activities are divided sexually; the men have responsibility for hunting and women for gathering.

b. Pastoralist food systems

Pastoralist (husbandry of migratory herd animals) is a cultural adjustment to semiarid open country in which native vegetation will support large ruminants but in which agricultural without advance technologies cannot be satisfied or sustained (Jerome et al, 1980). The characteristics of pastoralist community are:

- mobile with the associated limited material possessions
- militaristic, particularly with regard to raiding and protecting their herds
- male dominated patrilineal societies
- little or no concept of land ownership
- dependence of adequate water supply
- political cohesion

According to Goldschmidt and Sahlins in 1968, there are two types of these food systems: nomads and semi-nomads. The nomad community does not occupy permanent dwellings and does not practice agriculture; while the semi-nomads set up semi permanent settlements near water with part of the group, women and children, cultivating crops (Jerome et al, 1980).

The typical diet derives from the herds. Milk, milk products, and blood (taken from the necks of living animals) are staple foods. Although meat is eaten, slaughtering

of livestock is expectedly uncommon since the herd is the primary source of wealth. The animal-based diet is supplemented with vegetable foods which have been grown, gathered or acquired through trade. Economic activities are divided sexually, the men take full responsibility for the livestock, and the women take charge of all agriculture (Jerome et al, 1980).

c. Horticultural systems

Horticultural or "gardening" systems of food production are distinguished by a number of criteria. Technology in the food production is generally simple. Production is intended for household consumption rather than commercial sale (noncommercial); relatively little interdependence with outside groups for food, so market networks are not developed and social relations involving food production are primarily ceremonial and ritual. Surpluses of food production were exchanged directly among members of their own groups (Jerome et al, 1980).

d. The peasantry and the transition to cash economics

Peasants form part of a larger, compound society and are mutually dependent on the larger society (Foster, 1962). This dependence is the key factor distinguishing peasants from tribal people; the latter do not have economic arrangements with group in the larger society. Jerome et al (1980) quoted Wolf's work in 1966 that studied peasants as rural cultivators who raise crops and livestock in the countryside for household consumption. However, their surpluses are transferred to a dominant group of rulers who use the surpluses to underwrite their own standard of living or for distribution to other groups in the society.

Malnutrition and nutrition-related health problems of peasants appeared with the development of state societies. In one community, the decreasing average stature male population over time may represent the effects of an increasingly inadequate peasant diet. Other study shows that the transition to a fully cash economy and the shift from subsistence food crops to cash crops appears to be bringing about even more serious nutritional problems. This happened because the most fertile land is used for the cash crops (coffee, peanuts, cotton, cocoa) thus lowering the production capacity of the land under food cultivation. The shift to a cash economy also meant that a larger part of food is purchased instead of produced. The high cost of protein rich foods often makes them prohibitive, thereby forcing people into an affordable high carbohydrate diet, which is often much less nutritious than the original peasant diet. Therefore, under the appearance of economic progress nutritional status becomes vulnerable. Hughes and Hunter called this situation as "the hidden cost of development" (Jerome et al, 1980).

e. Industrialized agriculturists

Large-scale farming in modern industrialized nations is usually a capital and energy intensive business enterprise designed as a commercial venture that incorporates a wide range of knowledge and skills in agricultural science and business to achieve high productivity. In these wealthy nations, food is generally abundant. Food supply and consumption are dictated by the market due to consumer's food selection (Jerome et a, 1980).

The nutritional consequences of an industrialized food system are a product of complex interactions among multiple human biological and environmental components. Individuals achieve their potentials for growth; they mature early but many ingest an excess and possibly imbalanced supply of nutrients and other chemicals (Jerome et al, 1980).

2.4. Food and Culture

Food is a many-splendor thing. It is more than a collection of nutrients and most people do not make their choices of what to eat on the biologically rational basis. The nature of food intake is also shaped by social, religious, economic and politics (Sanjur, 1982). Food intake is a response to both biological and social needs. While the consequences of food intake are physiological or biological, the decision about which foods to consume is cultural. The importance of studying food and culture include:

- To understand food-pattern rules.
- To describe what people eat and why.
- How cultural rules contribute to, but do or do not determine food choice.
- To understand the social mechanisms of food choice and see how they change.
- To understand how food systems change.
- How does one introduce a new food into system.
- How can the food be modified to be more accepted in the culture.
- Could there be unintended consequences of systemic change in production and marketing.

a. Human foodways

Human food-ways is an integrated part of a coherent cultural pattern in which each custom and practice has a part to play. It includes procurement, preparation, and consumption of food. Food procurement can be derived from our garden production or from purchasing. The mode of production and the processes of food distribution affect food availability. Distance and time involved in getting to and from a food supply, cost of foodstuffs, and other factors affect accessibility (Fieldhouse, 1986).

Each path of human foodways has its own "gatekeeper", the one who has the authority regarding food which will affect the procurement, preparation and consumption of food in a household or society. Therefore, it is important to recognize the "gatekeeper". Consumption of food includes presentation, methods of eating, number of meals per day, time of eating and the size of portion eaten. Food habits come into being and are maintained because they are effective, practical and meaningful behaviors within a particular culture (Fieldhouse, 1986). It is also important to recognize that they are shaped and influenced by macro-level forces such as economic, political and social systems.

b. Food ideology

Eckstein in 1980 (Fieldhouse, 1986) defined food ideology as the sum of the attitudes, beliefs, customs and taboos affecting the diet of a given group. It is what people think of as food, what effect they think food will have on their health and what they think is suitable for different ages and groups.

A food belief system can be examined from two perspectives (Sanjur, 1982), each of which has relevance to the practitioner who must deal with it, i.e.:

- from the specific *commitment* of the individual (especially those who control the food channels of the household) to these food belief systems
- from a clear interpretation of the *health and nutritional consequences*.

Food beliefs are often inextricably linked to the larger belief system of a society. Concepts of health and nutrition must be dealt within the overall context in which they exist. In order to be able to do this, one must begin from the perspective of the people in the culture being studied. This is particularly important in that nutrition and health professionals must not be judgmental about people's food habits or categorize them as "good", "fair", or "poor" on the basis of scientific premises or rationales. In the absence of knowledge of the microbial theory of disease, people tend to establish their own relationships of cause and effect between certain foods and diseases (Sanjur, 1982).

Ethnocentrism, one example of food ideology, is how one feels about oneself compared to others; it described the belief that one's own patterns of behavior are preferable to those of all other cultures. People tend to view their own behavior as being right, normal and best (Fieldhouse, 1986).

In every society, there are rules which specify what constitutes a food and what does not. Categories of foodstuffs may be identified according to nutritional value, cultural usage, emotional importance, or a combination thereof. There are numerous ways of categorizing foods and food usages. Sometimes the categorizations have a rational basis; some with less apparent rationality have grown out of coherent folk-medicine systems. Passim and Benneth in 1943 described a food categorization based on the food value in a society (*descriptive category*) and how food choices should be made (*prescriptive category*) (Fieldhouse, 1986). Dietary intake is divided into *core* (subsistence crops, consumed frequently), *secondary* (purchased staples, consumed less frequently but still important), and *peripheral* food (recently available foods, eaten infrequently) (Pelto and Messer, 1989). Other categorizations are based on specific distinctions e.g. food or poison; hot and cold food; sacred or common.

c. Humoral system and healing foods

Food and folk medicine beliefs and practices are often inextricably linked to the larger belief system of a society. Many local health systems based on food and diet can be linked back to the humoral system, whose origins date back to ancient Greek and Roman medicine (ca. 460 B.C.). This medical system was based on four humors (or fluids) including blood, phlegm, black bile and yellow bile and the quality of these humors, as hot, cold, moist or dry.

The combination of these humors made up the complexion of people, illness, medicines, foods, and most natural objects. The normal, healthy individual was considered to have a slight excess of heat and moisture, but this balance varied with individuals, each person having a characteristic complexion. According to Foster in 1953, medical practice consisted primarily of understanding the nature complexion of the patient, determining the complexion of the illness, and restoring the fundamental harmony through administration of remedies (Sanjur, 1982). Southeast Asia imported from India some ideas about the cooling and heating properties of food and how food affects individuals at certain stages of their life cycle in certain season (van Esterik, 2008).

The humoral systems was maintained by the Arab world and introduced in Asia and North Africa and later in Spain in the 8th century. It was taken to the New World by the Spanish and has been a major component of traditional folk medicine and diet since then. The concepts of hot and cold foods are a prevalent throughout the world today. The hot-cold dichotomy in the folk ideology of food and medicinal practices in Latin America or Chinese Yin-Yang symbolism serves as useful examples of complexity of food belief systems. Ayurvedic medicine - an ancient Indian healing system that links body, temperament, and food - is probably the best humoral system in Asia (Sanjur, 1982; van Esterik, 2008).

Food and health are intimately linked in Asia, especially in India and Southeast Asia. Foods are combined in dishes and meals to maintain balance for the individuals consuming it. The distinction between hot and cold foods does not pertain specifically to the physical qualities of the food, but the inherent nature and impact it will have once consumed. Individual life stages are also attributed to hot and cold states related to the gender, reproductive cycle and disease state. These situations are classified in a systematic way, authorizing the therapeutic use of corresponding foods (de Garine I, 1972). The list of foods based on their heating and cooling properties are dynamic from one area to another area. Nevertheless, there is some consistency in the Southeast Asia region concerning the classification of foods (e.g. papaya is a heating fruit while most of fruits and vegetables, particularly juicy ones, are cold).

d. Social functions of food

Food has always been much more than a source of body nourishment; it has played a major part in the human social life. The various social roles of food in a society have an effect on the way how people make use of available food. In nutrition programs, it is important to study the role of food in a particular society. It is therefore useful to distinguish the following interrelated social functions of food in society (den Hartog et al, 2006; Fieldhouse, 1986; Sanjur, 1982).

- *Cultural identity*

Food often provides a basis for the cultural identity of a group of people, community or nation. From this perspective, people can be rather emotional towards their national food. In some cases, outsiders may identify a community or a nation with a food, often in a prejudicial nature. The Inuit arctic population group, until recently referred to as Eskimos, were given their name, which means “eaters of raw meat”, by neighboring Algonquin Indians, referring to their particular food habits (den Hartog et al, 2006; Fieldhouse, 1986). The Dutch are sometimes nicknamed “cheese heads”, referring to their national food, cheese. As a counter movement against the process of globalization and the danger of losing regional and national identity, interest in local cuisine is rising (den Hartog et al, 2006; Fieldhouse, 1986). Therefore in many ethnics and nations, songs are made as expression of pride and loving for our local foods.

The strict use of food creates and maintains boundaries and a common identity between population groups. This is particularly the case when dealing with food avoidance. In Muslim countries with Christian communities there is a clear distinction between those that eat or do not eat pork (den Hartog et al, 2006; Fieldhouse, 1986).

- *Prestige and status*

Food is a sign of wealth and status. In the same way people choose and wear their clothes, how people choose and consume their food is a means of becoming distinct from other population groups. Some foods confer high status on the consumers; others assume high status because of the groups who habitually eat them. Prestige may be attached to foods themselves or to the circumstances and manner in which they are served. All societies have prestige foods which are mainly reserved for special occasions. Usually foods of animal origin are very prestigious. Technology applied in producing the foods may also increase the prestige of the foods, such as canned food (Fieldhouse, 1986). Food can play a role in social snobbery, something which is to be found to various degrees in most societies. If one has a large array of choices then one has high status. The ability to choose freely is linked closely to economic factors (den Hartog et al, 2006; Fieldhouse, 1986).

Food ownership is also considered to be a mark of status. In a large part of the world, cattle ownership denotes a high social and economic status. In some groups, households without cattle may be barred from certain rites of passage and condemned to low social status (Fieldhouse, 1986).

Another example of food practices motivated at least partly by status considerations is that of breastfeeding versus bottle feeding. When baby milk formula first became widely available commercially in the 1930s and 1940s, the milk formulas were eagerly seized on as an alternative to the near universal practice of breastfeeding. Breastfeeding was then considered low class and the natural function became 'degrading'. By the 1970s, the social elite were spearheading the return to breastfeeding as the benefits were increasingly recognized.. Unfortunately, bottle feeding persists among less educated women from many lower socio-economic groups. In many parts of the developing countries, bottle feeding is perceived as being 'Northern' and 'modern' and therefore greatly to be desired (Fieldhouse, 1986).

- *Friendship and communication*

Food is a universal medium for expressing sociability and hospitality. It plays a significant role in communication within a community. The closeness of social relationships between people might almost be gauged by the types of foods and meals they share together. For example, a new neighbor may be invited for tea and biscuits, business associates are offered a buffet and close friends are invited to sit down and share a full meal (Fieldhouse, 1986).

The *slametan*, a ceremonial meal in Java and Madura, is an interesting example of sharing food and signifying bonds between people. The *slametan*, is a ceremonial meal held at specific occasion such as birth and marriage, but also in the modern setting such as for the opening of a factory or office. *Slametan* strengthen social bond, achieve and maintain harmony (den Hartog et al, 2006).

The act of eating together indicates some degree of compatibility or acceptance. Food is offered as a gesture of friendship. As indicated by Maslow's needs hierarchy, the social need to belong is an important motivator of human action. Food readily becomes an expression of the search for belongingness, in the attempt to 'fit in' as social circumstances alterations (Fieldhouse, 1986).

Food also has a role in communicating what is wrong or right, bad or good by using it as a reward or punishment. Concepts of good and bad which are quickly

attached to foods through early social experiences with children may give rise to feeding problems which can and often do persist into adulthood (Fieldhouse, 1986).

- *Food gifts and sharing*

Food is a universally acceptable gift by means of which the donor can express a variety of emotions such as concern, sympathy, or gratitude; food is frequently used to say "You are loved…you are important". Gift-giving is usually based on an unstated, but nevertheless expected, reciprocity (Fieldhouse, 1986).

Three types of reciprocity may be identified each of which has different rules for exchanges:

1) *Generalized reciprocity* is characterized by exchanges which involve no immediate expectation of return and no attempt to make gift-giving"balance out". Generalized reciprocity occurs between family members and close friends in most societies.
2) *Balanced reciprocity*, which occurs between people who are social equals and have some kind of personal relationship, does involve expectation of return, perhaps delayed, and takes account of the value of the gift.
3) *Negative reciprocity* involves immediate exchange and strict accounting of value and it is impersonal. Commercial transactions typify this kind of exchange. Food exchanges can also be ways of expressing friendship whilst maintaining economic parity; exchanges diffuse the status meanings of a food event. Food exchanges based on some form of reciprocity principle are common in situations where it would be disastrous to encourage intensive productive effort.

Potlatch is the popular examples of public food gift-giving in North-West Coast Indians. The host, with the support from his family, clan or tribes invited other tribes to witness his actions and claims. During the potlatch, gifts were distributed according to the rank of the guests. Food, money, property – all could be and were given. Guests were shamed by the large amounts of wealth given to them and immediately started to plan their own potlatches in which the wealth could be returned – with interest. This gift-giving practice can act as a means of redistribution of wealth amongst the tribes from rich tribe to others not so well off (Fieldhouse, 1986).

- *Feasts and festivals*

In general, the foods used for feasting are scare, high quality, often expensive and time-consuming to prepare. Feasts are held for many reasons: to celebrate a particular religious event, celebrate a harvest, offer appeasement to a God, bless the sowing, and or honor the dead the pay homage to ancestors. Sometimes, public feasts may be a way of spreading food to all sections of the population. However, they may also lead to overeating or even to exhaustion of food supplies (Fieldhouse, 1986).

(c)

Figure 2.1. "Gunungan" typical food for celebarating Islamic festival in Yogyakarta Sultan Palace

(d)

Figure 2.2. People compete to get the food for chasing their sultan's bless

- *Rituals and sacrifice*

Rituals are associated with religious or supernatural activities. They permit the expression of sentiments which cannot always be put into words and can thus act as a unifying social force. Many rituals, both pagan and religious, involve food in some way as offering or sacrifice. The most common reasons behind sacrifice are as food for God, to propitiate an affronted deity, to effect communication with a deity by eating of victim (omophagy), for maintenance or renewal of life, for divination purpose, to confirm a covenant, to ward off evil and in exchange of favours. Sacrifice implies an asymmetrical status relationship. Whilst a gift puts the recipient in an inferior social position, an offering emphasis that is the giver who is inferior status (Fieldhouse, 1986). The example of food for ritual use, such as for prayer or Prasad (god's food) that is distributed during holy activities, as we can find in church or temple.

(e)

Figure 2.3. Food for prayers among Hindu's community in Yogyakarta

- *Means of influence and power*

Food can be used at several levels as a means to exercise influence and power. Those people or groups in control of the food supply and distribution can also control society. This has become very clear in countries suffering from civil unrest and war. Food is utilized to manipulate the situation, to favor allies and to withhold food from

opponents. Despite its humanitarian nature, bilateral food aid can also be used to influence governments or population groups of recipient countries. Food at household level can also be used to gain influence by those responsible for the family food stock. Parents may reward their children with giving some special food or punish by withholding it (den Hartog et al, 2006).

2.5. Food Avoidance and Food Taboos

"One man's meat is another man's poison"
(Anonymous)

Food avoidances, often called *food taboos*, play an important role in many cultures when determining what food is and what is not considered edible. Food avoidance is a prohibition against consuming certain foods. The word "taboo" comes from Polynesian languages and means "sacred" or "forbidden", and has a quasi-magical or religious overtone. In the field of food and nutrition, food avoidance are not necessarily connected with magical-religious practices, but are also associated with aversion due to unfamiliarity, culturally determined taste preferences, or health concepts. The more general term food avoidance is preferred in the field of nutrition (den Hartog et al, 2006).

It is of interest to note that food avoidance most frequently relates to animal meat, since in most cultures humans have emotional relationships with the animals they have to kill to eat. There are also examples of other An outspoken food avoidance practices of non-animal foods, such as the prohibition against alcohol for Muslims and some Christian denominations.

In order to better understand the wide range of food avoidances from a nutritional point of view, it is useful to distinguish between permanent and temporary food avoidance (de Garine, 1972). Fieldhouse (1986) described some reasons for food taboos and avoidance, such as disgust, unfamiliarity, intimate familiarity, fear of infertility, condition of flesh (decayed, diseased), hygiene, to restrict slaughter of useful animals, sympathetic magic, transmigration of souls, totemism, sacredness of animal, religious sanctions, cultural identity.

Table 2.1. Classification of food prohibitions

Categories	Classification of Food Prohibition
According to length	• Temporary prohibitions (maybe list things here or remove this category), i.e. during pregnancy and lactation, during infancy until weaning, puberty and adolescence and during sickness • Permanent prohibitions, i.e. pork and alcohol for Moslems.
According to human group they interest	• A number of societies • A total society • One of the kinship groups in a given society • A socio-professional group • A social class • A masculine or feminine part of the society • Individuals according to specific individual experiences

Source: De Garine (1967) in den Hartog et al, 2006.

a. Permanent food avoidance

Foods that are permanently avoided are always prohibited for a specific group. The classic example of a permanent food taboo is the prohibition of pork practiced by Jews and Muslims. Some anthropologist point out that food taboos are based on the failure of these foods to fit into the usual systems of classification. Foods that do not fit into these classifications are unsuitable for consumption, or unclean. In the case of both Jewish and Muslim avoidances, the food themselves are considered unclean. Meanwhile, for Hindus, abstaining from eating beef is done because cows are considered sacred (den Hartog et al, 2006). According to Harris in 1985 and Simons in 1994, various arguments have been used to explain the origin of such food avoidances, including religion, culture, and hygiene. Some scholars have rightly pointed out that there must a logical and economic reason for rejecting certain foods (den Hartog et al, 2006). The pig is an animal of sedentary farmers and unfit for a pastoral way of life. Herdsmen generally despise the lifestyle of sedentary farming communities. Therefore, communities based on or influenced by pastoral traditions refrain from eating pork. Cats and dogs are not consumed in Western societies because of the emotional relationships developed with these pets. Pets are increasingly being "humanized" in such way that eating them is seen as an act of anthropophagi or cannibalism. Or some animals are as clan animals for certain community, based on the fact that they have been beneficial to the clan in the past. Therefore, there is feeling of closeness to certain animals. This custom can also be found in the savannah of West Africa, where certain West African clans consider dogs to be clan animals. As clan animals, they are unfit for consumption. In antiquity, dogs were also considered unclean and unfit to eat. This is still the case in the Mediterranean area and the Middle East (den Hartog et al, 2006). In contrary, dog meat is popular in many part of Asia, such as China, Northern Vietnam and in some part of Indonesia. From a nutritional point of view, dog meat is an excellent source of animal protein, and dogs do not require the grazing area demanded by cattle or other large animal.

b. Temporary food avoidance

Some foods are avoided for certain periods of time. These restrictions often apply to women and relate to the reproductive cycle. From a nutritional point of view; temporary food avoidances are of great importance as they concern certain vulnerable groups, such as pregnant women, breast-feeding women, infants and children during periods of weaning and growth. Food regulations and avoidances during these periods often deprive the individual of nutritionally valuable foods such as meat, fish, eggs, or vegetables. Some of these avoidances may seem odd from a scientific point of view, but there is often an unnoticed logic behind them. In the case of pregnancy, women in the first place are aware of the critical period of pregnancy and that much has to be done to ensure the successful delivery of a healthy child. Observing the rules of avoidance will give a pregnant woman the confidence in knowing that everything possible has been done for the benefit of the child. Another case of temporary food avoidance involves in the rules of fasting or emergency. During emergency i.e., in period of seasonal food shortage, people will collect the so-called "hungry foods". Hungry foods are mainly wild foods, often not very attractive and tasty and normally avoided (den Hartog et al, 2006).

Although food avoidances may seem rather stable, but they are often under pressure because of changes in societies. Some factors might alter food avoidances such as migration and emergency. Nutrition and health promotion has reduced temporary food avoidances among vulnerable groups in many parts of the world (den Hartog et al, 2006).

Summary

The interrelationship of food habits with components of cultural behavior and environmental forces emphasize the futility of treating nutritional needs as the prime element of food choices and food habits. The process of helping people to change their food habits in order to improve their nutritional status must begin with a readiness to understand their culture, to recognize the good in it, and to know the reason behind its development. Where dietary changes are introduced there is the probability that other social aspects of life will also be affected.

Food ideology in a given cultural group represents a collection of learned attitudes and behaviors which dictate not only what is acceptable as food, but also when and how that food is to be prepared, served and eaten. Each culture tends to think of its own rules and practices as being 'normal', and so deviation from common practice is usually considered as 'not normal' or 'foreign'. Food is extensively used in social intercourse as a means of cultural identify, to show prestige and status, expressing friendship and respect, celebration and festival, a weapon to humiliate rivals, parts of sacrificial and sacramental rituals.

Learning Activity 2.1. Food for thought: digging into family traditions

Task:

- Please describe special dishes of your families prepare for celebrations!
- Why those dishes are specially prepared for it? Relate it with the concept of food choice, food habit and social function of food.

Learning Activity 2.2. Rich Picture

'A picture tells a thousand words'. A rich picture helps us to understand the complexity of an entire situation. It is called a rich picture because it illustrates the richness and complexity of a situation. It is a way of thinking holistically. A rich picture helps us to see relationships and connections that we may otherwise miss. Developing a rich picture is also a good group exercise as everyone can add to it and use it to explain their particular interests or perspectives. A rich picture can also be a non-threatening and humorous way of illustrating different perspectives and conflicts.

Task: Please draw a rich picture about that may tell other how food is strongly related with culture in certain community! It may use text, symbols and icons to graphically illustrate the situation.

References

Benkheïra MH. Tabou du porc et identite en Islam. In Histoire et identités alimentaires en Europe. Bruegel, M and Laurioux, B (eds.). Paris. Hachette literatures, 2002.

de Garine I. The socio-cultural aspect of nutrition. Ecology of food and nutrition, 1972; 1: 143-16

den Hartog AP, van Staveren WA, Brouwer ID. Food habits and consumption in developing countries: Manual for field studies. Wageningen: Wageningen Academic Publisher, 2006.

Fieldhouse P. Food and nutrition: customs and culture. New York: Croom Helm, 1986.

Foster G. Traditional cultures and the impact of technological change. New York: Harper and Row, 1962.

McDonaugh CE. Tharu Evaluations of Food. In Food for Humanity. Chapman, M. and Macbeth, H (eds). Oxford: ICAF, 1990.

Sanjur D. Social and cultural perspectives in nutrition. New Jersey: Prentice-Hall, Inc., Englewood Cliffs, 1982.

Tylor EB. Primitive culture: research into the development of mythology, philosophy, religion, language, art and custom. London: J Murray, 1871

Van Esterik P. Food culture in Southeast Asia. Connecticut: Greenwood Press, 2008.

CHAPTER 3

Nutritional Adaptation

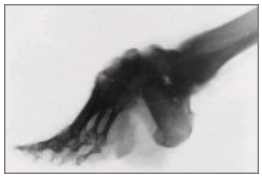
Duma Octavia Fransisca and Judhiastuty Februhartanty

Objectives:

1. To describe some basic concepts of human body adaptation as it relates to environmental conditions.
2. To elaborate the role of nutrition in the process of adaptation.

3.1. Introduction

The ecological framework as briefly described in Chapter 1 showed that human nutrition and health might be influenced by environmental conditions such as physical, social and cultural environments. At the most basic level, adaptation refers to the ability of the human species to survive in its environment.



X-ray of an early 20th century
Chinese woman's bound foot

The growth was stunted and the bones were significantly deformed so that they could fit into a tiny pointed slipper.

(f)

Figure 3.1. Adjustment to environmental stresses which involve a change in growth patterns and development
(**Source:** O'Neil, 2009)

When a man perceived that he was threatened by the environment, he prepares for action(s). The body mobilizes reserves of energy and produces certain hormones such as adrenalin, which prepare it for conflict or flight to face stresses; the heart beats faster and respiration quickens; the face turns red or pales and the body perspires; or

there is shortness of breath, cold sweats, shivering, and trembling legs. These physiological manifestations reflect the efforts of the body to maintain its internal equilibrium. And human continually has to face the changes in its environment which endorse biological/physiological and behavioral adaptations.

3.2. Human Nutritional Adaptation

Nutritional Adaptation can be defined as the process that diet plays in human adaptation as both a stressor (e.g. during food scarcity or abundance) or as a modifier of other stressors (e.g. illness, climate, altitude) (Waterlow, 1990; Stinson, 1992). These adaptations have been examined with respect to changes in dietary practices for enhanced consumption, individual difference in nutrient requirements in various locations, age and sex groups, and socio-economic factors that shape the use of food (Jerome et al, 1980).

Adaptations are always made at some cost and involve a choice, whether conscious or not. Successful adaptation often requires alterations in one or more body processes, and one critical function is preserved while another less important function is diminished. An adapted state is taken to be a condition in which a long-term, steady state has been achieved while function is maintained within an "acceptable" or "preferred" range. Whilst *accommodation* is used to describe a response that is not wholly successful or where the preservation of a significant function of interest has not been achieved, even though the individual's survival under the conditions imposed has been prolonged or maintained (Waterlow, 1990).

There are two types of adaptations:

- Biological and physiological adaptation (e.g. body response to high altitude, increasing of iron absorption when iron stores decrease)
- Behavioral and social adaptation (e.g. reduction of our activity as our body response to deficit of calories).

However the response to the environment can also be maladaptive. Maladaptive nutritional changes when the nutrients are limited for prolonged periods can lead to illness or even death. Examples of nutritional maladaptation are classical deficiencies such as scurvy, beriberi, rickets, pellagra, marasmus, and kwashiorkor; and dietary excess leading to obesity, dental caries, hypertension, coronary heart diseases and some types of cancer (Jerome et al, 1980).

Mazess in 1975 described a concept of nutritional adaptation to a stress or several stressors at biological organization levels ranging from biochemical functions, through responses of cells, tissues, organ systems, the individual, the population, or the ecosystem. Each higher level serves as the immediate environment for the organization level directly below it. Another set of organization categories of adaptation mentioned by Mazess is called "adaptive domains" which permits adaptation to be evaluated within any of these hierarchical levels of biological complexity. At the individual level, the adaptive domain includes physical performance, nervous system functioning, growth and development, nutrition, reproduction, health, cross-tolerance and resistance, affective functioning and intellectual ability. A response to any stress, if it is to be termed "adaptive" for the individual, must be shown to be necessary or beneficial to the

functioning of one or more of these adaptive domains. This deals with the factors that influence and may be influenced by variation in one of the adaptive domains – nutrition (Haas and Harrison, 1977).

3.3. Homeostatis System

The human body is made up of many complex systems and needs a system to maintain the stability and to survive. Thomas in 1975 used "homeostatis" systems approach to identify various stressors in the environment and the forms of behavioral or biological "buffers" that permits the population to adapt (Haas and Harrison, 1977). This model (Figure 3.2) shows the adaptive strategy employed as a feedback system that relies on characteristics such as the demographic structures of the group, the availability of vital resources, and the relative effect of the behavioral buffers to reduce the stress in order to prevent biological/genetic adaptation. In a homeostatic system, nutrition may serve as a stressor in the form of a nutrient deficiency or as a vital resource in the human environment that is necessary to activate a behavior or biological buffering system in response to other stresses.

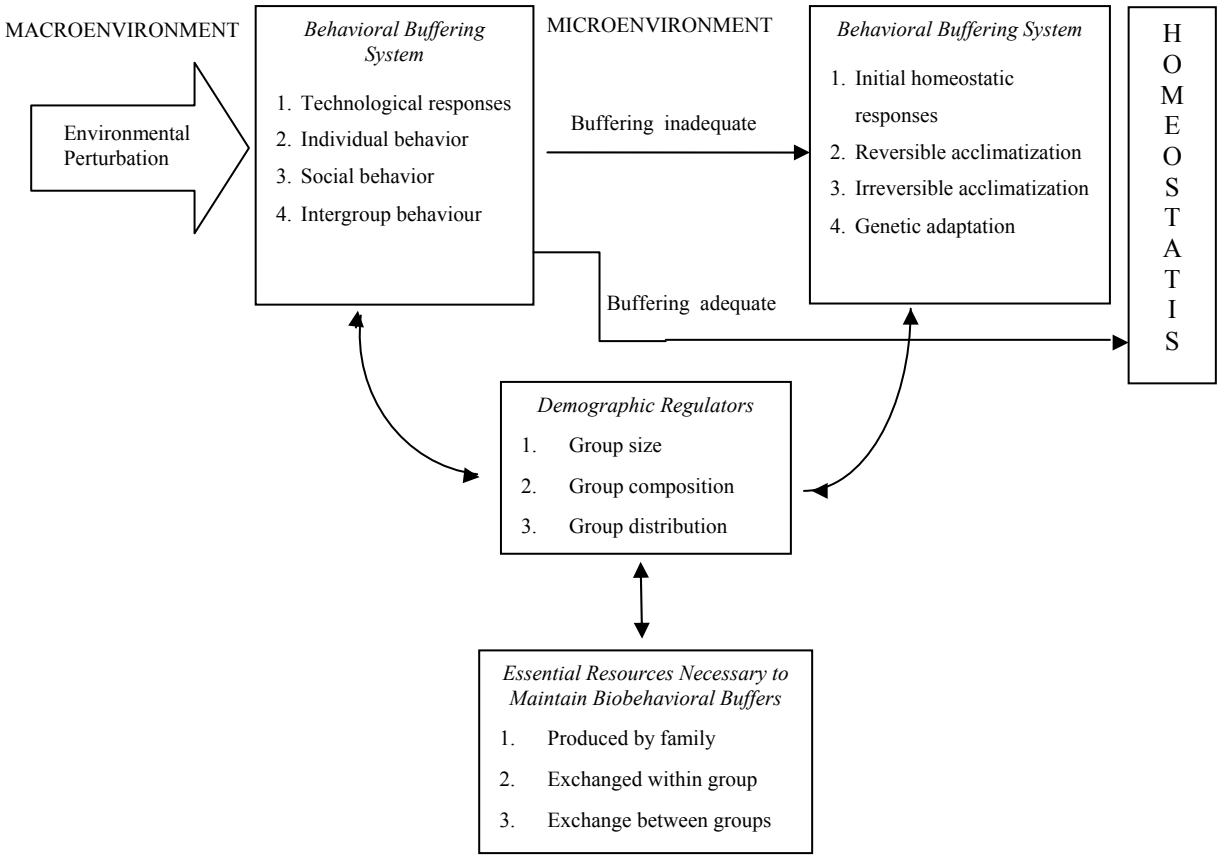


Figure 3.2. Factors influencing the maintenance of homeostatis
(**Source**: A. Damon 1975 in Haas and Harrison 1977).

This model is also useful to study the adaptation to multi-stress environments. Several single stresses can each be followed through the system and all components such as behavioral, biological, demographic, and resources response can be monitored.

Where changes in certain components differ or become incompatible with efficient adaptive responses to any other stress, one can predict potential risks or problem areas when the environmental stresses become more severe. Changing dietary patterns due to demographic or social change, environmental catastrophe, or periodic fluctuations in food availability could become very important to a high risk population, especially if food resources are already scarce or unreliable or nutrition plays an important part in the adaptive strategy to another stress (Haas and Harrison, 1977).

3.4. Nutrition Roles in Biological/Physiological Adaptation

Biological or physiological adaptations may occur due to climatic stress (such as cold, heat and ultraviolet radiation) and nutrient availability.

a. Climate stresses to nutrients utilization

Haas and Harrison (1977) reviewed several studies on human morphological and physiological response to cold stresses. Metabolic responses are a major mechanism for adaptation where thermogenesis must compensate for heat loss to environment. Foods with adequate amounts and type of nutrients are necessary to maintain a) adequate adipose layer for insulation to heat loss and as an energy reserve; b) efficiency of metabolic response to hypothermia and growth; c) development of children under cold stress as it relates to the development of an adult phenotype that may be more effective at reducing heat loss. For example a study by Rodahl in 1952 found that the thermogenic quality of the Eskimo diet with high proportion of animal protein and fat has been linked to the very active metabolic response of this population to total body cold exposure. The metabolic adaptations through increased glucogenesis, which account for efficient utilization of diets with extremely high amounts of protein and fats, is an interesting phenomenon in its own right. However, the additional heat generated through the specific dynamic action of foods is presumably the reason why the Eskimo has an unusually high metabolic rate, and can maintain high skin temperature under chronic cold exposure.

The role of nutrition in heat adaptation is less well understood. Haas and Harrison (1977) shared Folk's work in 1974 that nutritional aspects of heat tolerance are related to dietary mineral availability and water loss through perspiration. Human adaptation to heat is not so dependent on metabolic response. Consolazio's work and others in 1961 on nitrogen loss showed that effects of dehydration or physiological response to heat, originally proposed that protein requirements would be higher due to nitrogen loss in sweat. However, subsequent studies indicated that urinary nitrogen losses decreased as skin losses rose; therefore there was no net rise in protein requirements. Also significant is the observation that energy requirements increased as ambient temperature increases above 40^{o} C.

Haas and Harrison (1977) reviewed studies of Loomis in 1967 and Hamilton in 1973 on the skin pigmentation and Vitamin D biosynthesis. Loomis stated that light skin is considered to be adaptive in upper latitudes where it serves to absorb more ultraviolet (UV) radiation and thus promote Vitamin D synthesis in the epidermal layer of the skin. Therefore, dark skin is adaptive in the lower latitudes where it serves to screen out dangerously high level of UV radiation and thus provides protection from hypervitaminosis D. However, Hamilton's work suggested that Vitamin D explanation

is more plausible for adaptation in depigmented populations but argued that the quantitative aspects of the hypervitaminosis hypothesis for tropical man are uncertain.

b. Adaptations to low protein and energy intakes

For all essential nutrients there is a range of intakes within which physiological and biochemical mechanisms maintain long term homeostasis without apparent adverse consequences. If pushed to either lower or upper limits, intakes in these ranges will have adverse effects. Within this range, the organism has the ability to adjust the absorption, catabolism, and/or excretion of nutrients to maintain normal function.

Dr. Pathak (1958) conclude a study in India that in consequence of a long continued inadequate diet providing low intakes of calories, animal proteins, vitamins, and minerals, the body seems to develop a "nutritional adaptation" to low intakes. Such an adaptation may function through increased absorption and selective internal economy favoring more important needs (such as growth, mineralization of skeleton, vital metabolic needs) rather than the less important ones (such as body weight, etc).

Waterlow in 1986 described that as the levels of protein intake are reduced, amino acids are reutilized more efficiently; protein breakdown and synthesis are reduced such that intake balances obligatory nitrogen losses. Though this condition seems without harmful consequences, there is an argument that reduced protein turnover may have a negative impact because it reduces the organism's ability to respond to trauma and infection. Some studies suggested lower protein and energy requirements in individuals with habitually low protein and energy intakes (Stinson, 1992).

Another interesting issue is whether small body size (i.e. stunting) is an adaptation to malnutrition. Garrow and Pike in their work in 1967 suggested that small body size is advantageous under condition of nutritional stress because small individuals require fewer nutrients for growth and maintenance; and it has been proposed that fast-growing children would be more likely to become severely malnourished when food supplies are limited (Stinson, 1992). Other studies revealed that small body size does: a) reduce the caloric costs of performing certain tasks; b) enable individuals to perform certain tasks at a lower energy cost, but it does not necessarily result in greater work efficiency.

Seckler's study in 1982 proposed a hypothesis of "small but healthy". He argues that individuals who would be considered to suffer from mild to moderate malnutrition because of their stunted growth represented successful adaptation to undernutrition because they have adjusted their growth rates and nutrient needs to limited food supplies without suffering functional impairment. Another argument by Scrimshaw and Young in 1989 was that small body size is an accommodation of human body to undernutrition, not an adaptation, because of the harmful consequences of small body size (Stinson, 1992).

Young and Marchini in 1990 conducted a study on metabolic responses to altered intakes of protein and amino acids. They argued that internationally accepted protein requirements at that time are too low; intakes at this level necessitate accommodation. Many populations habitually consume substantially more protein than the accepted requirements. If these persons were to reduce protein intake to the existing requirement, their bodies would not maintain an adaptive or desirable nutritional state and would be vulnerable to major physiological stresses (Stinson, 1992).

c. Population differences in nutrient utilization

The best example in which human population differs in their ability to utilize a particular source of nutrients is that of continued production of intestinal lactase in adult. This enzyme enables the utilization of lactose, the carbohydrate source in mammalian milk. This enzyme has function to break lactose down into glucose and galactose so it can be easily absorbed in the small intestine.

The ability of individuals to digest lactose varies between populations. Unlike the northern Europeans and some herding groups in Africa and the Middle East, many populations in the world do not retain high intestinal activity of the enzyme lactase into adulthood. Most adults in many populations have low levels of lactase activity and may suffer from intestinal symptoms of intolerance including bloating, flatulence, and diarrhea after they drink milk and milk products high in lactose. Some findings suggest that lactase is an inducible enzyme and that the ability to digest lactose is maintained into adulthood by continued consumption of lactose-rich dairy products after the weaning period; this ability is then inherited to their offsprings. This, however, is argued by other findings that lactose digestion capacity is unrelated with milk consumption. In fact, this subject is not yet fully understood (Stinson, 1992).

3.5. Nutrition Roles in Behavioral Adaptation

Behavior and culture developed progressively as a result of the human response to their environmental conditions, such as behavioral responses to nutritional limitations of staple energy sources, the use of foods and food supplements as pharmacological agents, behavioral responses to scarcity and to abundance of food resources.

a. Behavioral responses to nutritional limitations of the staple crop

Since agriculture technologies have grown vastly, most human populations cultivate cereal cultigens for their major energy source which can provide high yield of food energy, though has limitation in nutrient contents. The staple cereal in developing countries supplies around 70% or more of caloric needs. Thus the nutritional limitations of the staple cereals become critical and biological and cultural means of coping with these constraints must be developed.

In *rice-based diets*, the main nutrition limitations include the quantity of protein and vitamin content. Milling and washing rice practices remove most of the thiamine and other water-soluble vitamins in rice, and protein content may also be decreased significantly. The results in populations which subsist on milled rice have been endemic beriberi and protein-energy malnutrition. Favorable practices which tend to increase the amount and quality of available protein and to improve the supply of vitamins in rice diet include the very common consumption of dried or fresh fish, fish sauces, soy products and fresh vegetables with rice (Haas and Harison, 1977).

A favorable practice from India is that of parboiling, in which the unhusked rice is steamed and then dried before milling. This technique diffuses water-soluble nutrients through the grain so that a smaller proportion of these nutrients are lost in subsequent milling and washing. Adult beriberi is much less common in areas where rice is parboiled than in rice-eating areas which do not practice this custom (Haas and Harrison, 1977; Stinson , 1992).

Corn-based diets also have nutritional limitations. Zein, the principal protein component of corn, is relatively low in the amino acids lysine and tryptophan and high in leucine; corn is also relatively low in niacin and most of the niacin present is in a form which cannot be utilized. Thus the quality of the protein is low and corn-eating populations additionally run a high risk of pellagra. The high-leucine/isoluecine ratio in corn has been reported to have an antagonistic effect on the conversion of tryptophan to niacin, thus further enhancing the niacin shortage. Favorable practices which can improve the value of corn-based diets are a) consume maize with beans, whose amino acid composition complements that of maize; b) treat the corn with alkali (lye, lime or wood ashes) before grinding in the preparation of tortillas. This treatment has a beneficial effect on the availability of lysine and niacin in maize and on the essential amino acid composition and concentration (Haas and Harrison, 1977; Stinson, 1992).

In rural Iran, flat bread made from whole *wheat meal* supply at least 50% to 70% of the energy intake. Wheat is ground into whole meals locally by stone mills and is sifted minimally. The result is a product which contains lots of fiber and phytate of the original kernel. Phytate combines with calcium, iron, zinc and other nutrients form poorly soluble compounds which are not readily absorbed from the intestine. Some recent findings also suggest that dietary fiber may be responsible for interference with mineral absorption. Thus, high-fiber, high-phytate diet may contribute to the high incidence of rickets and osteomalacia, hypogonadal dwarfism of zinc deficiency, and iron-deficiency anemia that afflict many in this area. It is suggested to combine the bread with animal products and other foods (Haas and Harrison, 1977).

The *cassava-based diet* (also referred to as *Manioc*) is widely found in the world. Manioc produces high energy yields, requires less labor and requires less of soil nutrients than cereal crops. Cassava is also tolerant to drought, pets, weeds, and adverse soil conditions. Cultivation of manioc as a staple crop can free both labor and capital to develop sources of high-quality protein. In the future, manioc may become an important crop in an ecologically deteriorating world. The major limitations of manioc are its very low protein content compared to cereals and the fact that it contains, to varying degrees, the highly toxic compound prussic acid. The concentration of prussic acid varies from harmless to lethal amounts, with so called "sweet" manioc containing lower concentrations than "bitter" manioc. Manioc contains significant amounts of calcium, ascorbic acid, thiamine, riboflavin and niacin. Grating, heating and soaking practices can help in reducing the prussic acid content to safe levels (Haas and Harrison, 1977).

b. Food and food supplements with pharmacologic effects

African and Mediterranean communities have for many generations lived with high frequency of the sickle-cell allele. Cassava-based diet may serve as a buffer against the effect of sickle-cell anemia. Cyanate, the break down product from cassava found to be effective in disrupting the hydrophobic-bonding holding the Hb-S molecules together, in inhibiting sickling, in extending the life of red cells containing Hb-S; and in decreasing the frequency of painful crises in homozygotes. The effect could be shown at doses of cyanate well below the toxic level. The major advantage of manioc-based diets in some tropical areas is their ability to effectively mitigate the severe effects of sickle-cell anemia (Haas & Harrison, 1977).

Another food-drug adaptation is the role of coca (*Erythroxylon coca*) chewing of the marginally nourished highland Peruvian community. Coca can maintain blood glucose levels and provide nutritional supplements in the diet. Coca is chewed at frequent interval throughout the day and result in rapid elevation of blood glucose level after chewing. Coca in the amounts chewed adds significant amounts of calcium, thiamine, riboflavin, and ascorbic acid to the diet. However, it can be questioned just how much of these nutrients are absorbed considering the leaf is never swallowed. There are other pharmacologic effects such as the slowing of intestinal motility, tolerance and energy conservation in the cold and increased endurance to work (Haas and Harrison, 1977).

Another example of the use of nonfood items to supplement a deficient diet is *geophagy* – eating earth or clay. Geophagy is one type of Pica (eating of nonfood items behavior). Geophagy is common in Africa among children and adults, and is integral part of the folk medical system of many groups. Earth is dug from a shrine or the grave of an ancestor or holy person and is widely used as medicine to control diarrhea, gastric irritation and syphilis. The practice is universally more common in women than in men, and in all groups geophagy is associated to one degree or another with pregnancy or lactation. Vermeer's study among Tiv community in Nigeria reported that 14% of men and 46% of women he interviewed reported eating clay and women consumed more than men. Chemical analysis of Ghanian clays indicates that significant mineral supplementation may occur through this practice. The mineral content of clays varies widely, but on the basis of in vitro digestion, Hunter estimates that if an individual consumed 30 grams of clay per day, iron supplementation would range from 16% to 66% of the Recommended Dietary Allowances, copper up to 33%, calcium 4%, magnesium and zinc 4% and 9% (Haas and Harrison, 1977; Stinson, 1992).

c. Behavioral responses to abundant food supplies

Of perhaps less immediate concern are the responses of human populations to abundant food supplies. The social organization of northwest coast American Indians has long been a subject of anthropological interest, with the controversy centered on the role of the potlatch as a ceremonial mechanism for the redistribution of resources. Abundance of food supplies, coupled with uneven access to these supplies, is the situation of most industrialized countries (Haas and Harrison, 1977).

Another study by Rathje and others in 1977 noted that increase in food waste in urban United State population is a predictable response to food abundant and diversity. As food supply increases, people start to consume more diverse food, and as the result food waste increases.

The interplay of behavioral and biological responses to the food supply under condition of affluence poses many questions of anthropological interests. More research is needed on how the population of the developing countries - as a result of globalization - may cope with abundance of food supplies.

3.6. Nutrient Deficiencies and Behavioral Disorders

Specific nutrient deficiencies have roles in certain behavior disorders, such as iodine deficiency resulting in cretinism, and calcium deficiency leading to arctic hysteria.

Iodine deficiency is a major cause of the endemic goiter (an enlarged thyroid gland) and cretinism. Although goiter is not necessarily harmful to the individual, it can alert health workers that a far more critical problem of iodine deficient cretinism may also be present in the population. Greene in Stinson (1992) showed the social cost of maintaining a high percentage of mentally retarded cretins in the village where 17.4% of the normal adult population also exhibit symptoms of neurological dysfunction. Greene observed that many factors contribute to this situation especially the socioeconomic status of the community. These individuals live on the least productive land and are economically exploited by a mestizo (higher) class who believe the Indian's poor intellectual performance is genetically based. In fact, the reduced mental facilities are neurologically based behavioral deficits produced by nutritional factors which themselves have been produced, to a great degree, by the nature of the social arrangements and the uneven distribution of economic resources.

Calcium deficiency is a contributing factor in the etiology of several psychological disorders. Foulks found that serum calcium levels were normal in the general population and marginally low in patients who reported frequent attacks of hysteria. Low calcium intake may account for the common occurrence of this psychosis among selected groups of Arctic Eskimos. Another mechanism to explain low calcium levels is suggested by data from Mazess and Mather on bone loss among Canadian Eskimos. Other studies have observed negative calcium balance in persons on high protein diet (Haas and Harrison, 1977).

Summary

Changes in human body happen as adaptation processes due to its response to stresses in the environment to maintain its functions, survival and reproduction.

Nutrition also can act as a stressor and modifier to other stressor to human body especially during food scarcity and poor environment.

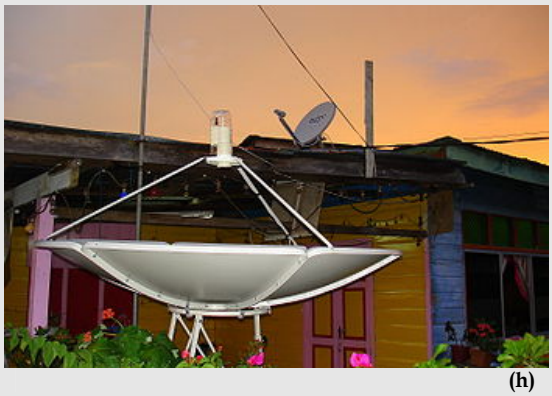
Nutritional adaptation is a mechanism of human response to the changes in nutrient requirements regarding age, sex, activity, stress, disease, climate, altitude and a wide range of socio-economic factors.

Case study:

Kampong Ayer

(g)

A water taxi heading to a school at Kampong Ayer



(h)

Sunset in Kampong Ayer

The **Water Village** (Malay: *Kampong Ayer*) is an area of Brunei's capital city Bandar Seri Begawan that is situated in the middle of the Brunei River. 39,000 people live in the Water Village. This represents roughly ten percent of the nation's total population. All of the Water Village buildings are constructed on stilts above the Brunei River.

The Water Village is really made up of small villages linked together by more than 29,140 meters of foot-bridges, consisting of over 4200 structures including homes, mosques, restaurants, shops, a school, and a hospital. 36 kilometers of boardwalks connect the buildings. Private water taxis provide rapid transit. Most of these taxis resemble long wooden speed boats. From a distance the water village looks like a slum. It actually enjoys modern amenities including air conditioning, satellite television, Internet access, plumbing, and electricity. Some of the residents keep potted plants and chickens. The district has a unique architectural heritage of wooden homes with ornate interiors.

People have lived in Kampong Ayer for over 1300 years. Antonio Pigafetta dubbed it the Venice of the East when the fleet of Ferdinand Magellan visited in 1521. The district is a culturally important part of Brunei that preserves the nation's river dwelling origins. According to geography professor Abdul Aziz of the Universiti Brunei Darussalam, this is the largest and most famous water settlement of Southeast Asia. "It was historically the very core of Brunei and one of the most important centers of trade in Borneo."

In order to preserve Kampong Ayer as Brunei Darussalam's most valuable heritage, the Government through the District Office has provided it with numerous facilities including foot-bridges, concrete jetties, piped water, electricity supplies telephones, a school, mosques, clinics, a police station and a marine fire station. All of the six water village mukims (districts) are collectively known as the water village (Kampong Ayer) but are identified as separate mukims for administrative purposes.

Source: http://en.wikipedia.org/wiki/Kampong_Ayer. Accessed on 1 August 2009.

Learning Activity 3.1.

Thomas (1975) has described a homeostatic system to explain the roles of environment and nutrition in human adaptation. Sikka District is located in East Nusa Tenggara Province, Republic of Indonesia, with a size of 1731.91 km2 consisting 18 populated and unpopulated islands. It is an arid area with humidity of 82% and temperature 27.7^{o} C (in year 2005). The main staple food is corn. Meat is occasionally consumed, mostly during feast seasons.

Task: Explain the biological/physiological and behavioral adaptation may occur in this area and how it can happen.

References

Haas JD and Harrison GG. Nutritional anthropology and biological adaptation. Ann. Rev. Anthropol 1977; 6: 69 -101.

Jerome NW, Pelto GH, Kandel RF. An ecological approach to nutritional anthropology. In: Jerome NW, Kandel RF, Pelto GH (eds). Nutritional Anthropology: Contemporary approaches to diet and culture. New York: Redgrave Publishing Company, 1980.

O'Neil D. Human biological adaptability: An introduction to human responses to common environmental stresses. Behavioral Sciences Department, Palomar College, San Marcos, California, 2009. Available at http://anthro.palomar.edu/adapt/Default.htm. Last accessed 17 September 2009.

Pathak CL. Nutritional adaptation to low dietary intakes of calories, proteins, vitamins, and minerals in the tropics. Am J Clin Nutr 1958; 6 (2): 151-158.

Stinson S. Nutritional adaptation. Annu Rev Anthropol 1992; 21: 143 – 170.

Waterlow JC. Nutritional adaptation in man: General introduction and concepts. Am J Clin Nutr 1990; 51: 259 - 263

http://en.wikipedia.org/wiki/Hypoxia_(medical). Accessed 20 July 2009.

Young VR and Pelletier VA. Adaptation to high protein intakes, with particular reference to formula feeding and the healthy, term infant. J Nutr 1989; 119: 1799-1809

Young VR and Marchini JS. Mechanisms and nutritional significance of metabolic responses to altered intakes of protein and amino acids, with reference to nutritional adaptation in humans. Am J Clin Nutr 1990; 51: 270-289. (abstract). (http://www.faqs.org/abstracts/Health/Mechanisms-and-nutritional-significance-of-metabolic-responses-to-altered-intakes-of-protein-and-ami.html)

CHAPTER 4

Seasonal Constraints in Food Supply

Duma Octavia Fransisca and Judhiastuty Februhartanty

Objectives:

1. To describe the influence of seasonality on food availability.
2. To explore how households develop coping strategies to ensure their survival.
3. To discuss fuel scarcity and its influence on food availability in households.

4.1. Introduction

Food security at the household level means access to food at all times. According to Fieldhouse (1986) and den Hartog et al (2006), the degree of food availability is strongly determined by:

- Natural environment (e.g. geography; soil fertility; climate and ecology)
- Technological development (e.g. type of cultivation practices; mechanization practices; facilities for storing, processing and transporting food; roads and transportation systems and stage of industrialization)
- Economic forces (e.g. subsistence economy versus market economy; level of purchasing power; percentage of food imports in the region)
- Social forces (e.g. just or unjust land tenure systems; level of education of farmers and homemakers; availability of health facilities and services).
- Political issues (e.g. agricultural policies, nutrition policies and guidelines, trade and aid policies, tariffs and quotas)

In all these situations, households develop food coping strategies in order to survive.

(i)

A photograph taken by Kevin Carter - a freelance photographer; published in the New York Times and won the 1994 Pulitzer Prize

Figure 4.1. A heartbreaking moment capturing a child who had collapsed from hunger and a vulture waiting to prey the child during a famine in Sudan in 1993.

4.2. Seasonality and Uncertainties in Food Supply

Den Hartog et al (2006) mention that climatic seasonality and agricultural periodicity affect many aspects of daily life. Some of these effects include changes in labor needs, food consumption, nutritional status, health, vital events and various aspects of social life. Seasons in the temperate regions of the world are primarily determined by fluctuations in temperature and sunlight.

In tropical areas, seasons are generally distinguished on the basis of rainfall distribution throughout the year. This would include:

- Climates with no real dry season (found on and near the equator)
- Climates with two rainy and two dry seasons, the bimodal climates (found close to the equator).
- Climates with one wet and one dry season, the unimodal climates (found further from the equator).

In general, people living in a bimodal climate experience less seasonal stress than those living in regions with only one rainy season. For example in savannah zones of tropical Africa, the effect of the long dry season on food availability is very sharp. At the end of the dry season and the beginning of the rainy season, when the household grain silos (storage) are nearly empty, the period is termed "the hungry season" and seasonal food shortages can cause seasonal body-weight losses of 2-6 % of the total body-weight (Durnin et al, 1990; Van Liere et al, 1994 in den Hartog et al, 2006).

Furthermore, the degree of food availability in rural areas is strongly determined by the geographical zone where the community is situated. In rural area, food shortage can be defined as unpredictable events (e.g. droughts, floods, and earthquakes) and predictable events (e.g. regular season such as rain, dry season). In urban areas, food shortages can also result from economic crisis and inflation.

4.3. Copying Strategies during Food Shortage

Households living in seasonal food shortage regions have developed numerous coping behaviors over the course of time. Coping behaviors can be defined as strategies to resist problematic situations such as food shortages. Such households are more prepared than households living in regions where food shortages seldom occur. Households in a region with marked seasonality take two kinds of measures: preventive measures and the actual coping strategy when it arrives.

The first coping strategy is focused on the diet. This results in a decrease in food consumption by reducing in number of meals, reducing portions, and diluting meal with extra water such as a porridge or stew to suppress felling of hunger. When a food shortage lasts longer, non conventional foods will be consumed (hungry food). These foods are omitted from the diet when common food is abundant again. When shortages further continue, people may turn to the extremely hazardous measure of consuming seeds put aside for sowing. The situation can be further characterized by a loss of body weight and deterioration in health status. Impacts of food shortages can be seen at the social level; rules of hospitality and reciprocity between household and individuals become looser and forms of aggressiveness develop (den Hartog et al, 2006).

Preventive measures might include planting more drought resistant crops, increasing food storages leaving only a minimal amount of surplus can be sold for cash. The pressing need for cash may cause too many household food stocks to be sold. As stocks run out additional food has to be bought at high prices (den Hartog et al, 2006).

Besides adjustment of the diet, household members also make an adjustment of a physiological nature, such as the reduction of physical work, reducing time allocated to repair works, or diminishing the intensity of the activity. A temporarily undernourished population will prepare the fields for the coming new agricultural season at the beginning of the rainy season (De Garine and Koppert, 1988; Sanaka Arachi, 1998 in den Hartog et al, 2006).

The degree of household food shortage is determined by the remaining available quantity of food and the expected duration of the shortage. This may happen during what seems to be a usual seasonal shortage, but which slowly develops into a chronic shortage. Global Information and Early Warning Service of the UN and national early warning systems have done much work in predicting food shortages so that appropriate measures can be taken (den Hartog et al, 2006). Tabel 4.1 shows a degree of household food shortage in rural areas which determined by the nature and duration of the shortage.

Table 4.1. Food shortage and the degree of household coping strategies in rural areas

Type of copying	Specific Action
1. Seasonal Shortage	
Reduction of quantity	• Reduction in number of meals • Reduction of portions • Diluting meal with extra water • Adding inedible substances to the meal
Adjustment of dietary habits	Consumption of unconventional foods • Famine foods, e.g. plants and animal not eaten otherwise • Consumption of sowing seeds
Using up cash	Purchase of food (at high prices)
2. Shortages of a Chronic Nature	
Selling of property	Selling jewelry, clothing (gender issue) Selling cattle, land (impoverishment)
Roaming for food	Lending money for food (high interest) Borrowing food from other households Wandering in search for food in other areas Raids
Migration	Temporary migration to other areas Boarding out of children elsewhere
Religious measures	Prayer and magic (e.g. rainmaking)

(**Source:** den Hartog et al, 2006)

A seasonal food shortage may evolve into a chronic situation from time to time, and eventually leading to famine. Some households turn to other strategies such as selling property and borrowing money or food, often at very high prices, and selling cattle or women's jewelry. Poor households will start roaming for food and as the shortage continues this is followed by the better-off households. To meet a continuously

worsening situation, people may turn towards religious supports in form of prayers to God or begging the gods for help. Others may turn to magic such as rainfall ceremony (den Hartog et al, 2006).

A study in Bangladesh by Abdullah and Wheeler (1985) showed that the highest protein and energy intakes were during the time of food for work period and the lowest was before the harvest. The first relates with the fact that during dry season more work and activities are done to fulfill family needs. On the other hand, during cold season, the intake was low due to less activity, and the fact that cold weather seems shorten the length of the day. Furthermore, the end of the harvest season does not mean a large increase in food stock but rather a reduction of income.

Strategies during Food Crisis in South Asia

1. Dietary alteration (consuming lower quality food, changing staple food)
2. Diversifying income generating activities (work as a porter, selling timber and herbs, producing alcohol and bamboo mats)
3. Social network (borrowing from neighbors)

4.4. Gender and Food Shortage

Women in most societies fulfill a central role in supplying, preparing and distributing food among the different household members, especially young children. Seasonal food shortages result in yearly recurring additional burden for women. Even under difficult conditions women are expected to be able to prepare a meal. Seasonal food shortages generally coincide with a lack of sufficient drinking water for both human and animals. Fetching water is a task of women and older children. During the dry season, especially in savannah zones, water needs to be fetched from farther distances (den Hartog et al, 2006).

Wheeler and Abdullah (1988) studied food allocation within family members in Malawi and Bangladesh communities as a response to food fluctuation. The rural people of Malawi and Bangladesh appear to have an accurate perception of adult's and older children's needs. In times of food shortage, parents are concerned about giving their children as much as they possibly can. Some discrimination against young girls does occur in Bangladesh. A study of food and nutrition security in Philippines by Balatibat in 2004 shows that in food shortage situation, the mother tends to distribute the food equally among other members of the household, except the father, who is given a larger portion of viands (den Hartog et al, 2006)

Based on studies by Jiggins in 1986 and Balatibat in 2004 (den Hartog et al, 2006) the workload of women during food shortages can be determined, among other factors, by the following:

- The seriousness and duration of the food shortage
- The assistance women can get from their children or other women in the household; the willingness of the husband and other men to suspend the gender-

specific role patters in food and nutrition, or simply, to perform women's tasks in stressful situations. In poorer households, men will have to assist sooner in women's tasks than in relatively richer households.

- Power relations in decision making about how household resources should be allocated for food purchases will further determine the struggle for maintaining household food security; who owns the household resources such as land, cattle, jewelry, and clothe, and who is authorized to sell possessions for food when needed. Jewelry and clothes are often a savings in kind among women. Forced sales of these goods may deteriorate the position of women.
- The physical conditions of women, which will be weakened towards the end of the dry season and further deteriorate during the rainy season when much agricultural work has to be performed.

Child labor

During food shortages, households use the children to earn and contribute to household funds.
In a case study from Bangladesh, around 48% of households use child labor in the low-economic subgroup.
Examples of type of child's work include selling small goods and newspaper, child labor in the market, in fisheries and small scale home industry.

Source: De Garine, I and Harrison, G. A (eds), 1988.

4.5. Fuel Scarcity, Food Preparation and Nutrition

Most foods have to be cooked in order to make the food digestible. Abraham in 1986 stated that one of the major innovations of early man was the application of fire to food preparation. This is a major step in human advancement and human nutrition (den Hartog et al, 2006). This has resulted in a large range of animal, plants and cereals digestible for man by breaking down food cellulose and improving bioavailability of nutrients.

The stages of food preparation development are: first roasting on an open fire, followed by boiling food in water in vessels, and later the technique of baking in an oven. In some civilization of the Pacific islands, traditionally large meals and feasts are prepared in temporary kind of "stone oven". A fire is built on a flat layer of stones, when the fire has burnt out the hot top stones are removed and the flat layer swept clean. Food wrapped in leaves will be placed on the layer and covered with hot stones and some more layers. The food is boiled by dropping water on the hot-red stones, which are lifted with bamboo tongs (den Hartog et al, 2006).

The main fuel used for cooking at the household level in rural areas of developing countries is usually wood, supplemented with crop residues or animal dung. Wood is now mainly collected outside the forests; from village or household wood lots, from tree and shrubs scattered over agricultural fields and wasteland. Wood collection in most societies is a woman's task, often assisted by their children and is often combined with other activities (Cecelski, 1987; Brouwer, 1994 in den Hartog et al,

2006). In rural areas, firewood is still free, but women mostly have to cover a greater distance and time to acquire it, which implies an increase in workload. This situation may be exacerbated during food shortage since wood has become increasingly demanded by other population too.

The supply of fuel wood is rapidly decreasing because of deforestation. The high demand on fuel wood results in the disappearance of shrubs and solitary trees. City households are faced with rising fuel prices; and fuel substitutes exist such as electricity, kerosene and coal, but for the poor urban households these are very expensive. Buying already prepared food from street food vendors is an option for saving on fuel costs, although consequently it increases the family expenditure since food bought outside is mostly with higher cost compared to home-made food. People in rural areas are encouraged to plant fast growing trees near their homes or along roadsides. In many countries, projects have been initiated to promote energy saving cooking techniques and the application of alternative energy (den Hartog et al, 2006). However, this effort has another consequence as it has also led to drying of land because of the large water needs of the fast growing plants.

The use of inferior fuel for cooking such as crop residues, animal dung, or small wet twigs tend produce a great deal of smoke and cause respiratory and even eye diseases for those who reside near the fire, such as women and children. Cecelski's study revealed that the preparation of fewer meals and the consumption of cold or warmed-up leftovers is a frequent strategy used to cope with fuel shortage (den Hartog et al, 2006). Table 4.2 shows the probability of adaptation and change response of women in Malawi to a hypothetical fuel wood scarcity.

Table 4.2. Sequence of adaptation of daily dietary patterns to a hypothetical fuel wood scarcity by women in Nicheu District, Malawi (n=20)

Dietary pattern	**Adequate fuel wood availability**	**Marginal fuel wood availability**	**Fuel wood shortage**	**Severe fuel wood shortage**
Breakfast	Porridge (phala)			
Lunch	Nsima with pumpkin leaves	Nsima with pumpkin leaves		
Snack	Boiled maize kernels			
Dinner	Nsima with beans	Nsima with pumpkin leaves	Nsima with pumpkin leaves	Porridge

(**Source:** Brouwer et al, 1996 in den Hartog et al, 2006)
Note: Nsima is a thick maize flour porridge, the relish contains occasionally fish, meat is seldom consumed.

Brouwer et al in her exploration in Malawi in 1996 found that women would first replace the bean relish with other type of relish and forego less important dishes such as boiled maize kernels and porridge for breakfast. As an alternative to beans, women would cook pumpkin leaves in large amounts for lunch so leftovers could be used for dinner, or they would choose another relish which needed less fuel. In the last stage, only one meal was left. Women were asked at the end of the interview whether the

adaptations mentioned reflected a realistic situation. Most of the women stated that they were sometimes already forced to drop or to replace dishes because of fuel shortage. However, they would always try to find wood or other fuel to prepare lunch and at least dinner (den Hartog, 2006).

Summary

Climatic seasonality and agricultural periodicity affect many aspects of daily life including changes in labor needs, food consumption, nutritional status, health, vital events and various aspects of social life.

In rural area, food shortage can be a result of droughts, floods, earthquakes, and also regular seasons such as rain and dry. In urban areas, food shortages can also result from economic crisis and inflation.

The coping strategy to food shortage is dependant to whether the shortage is seasonal or long-termed. The strategy starts from dietary modification (reducing quantity and quality), using up cash, selling of property, migration, up till use of magic for rainmaking. Another coping strategy includes the advent of child labor for an increase of family purchasing power. In addition, women shared most additional workloads during food shortage.

As most foods need to be cooked to increase its digestibility and bioavailability, our dependency towards fuel is unavoidable. In the course of fuel shortage, again, coping in terms of food preparation, cooking method and meal frequency is mostly done.

Case study:

Status and Food Procurement in Nepal

The first proposition is that low socioeconomic status compels a quest for food. In overpopulated rural areas of Nepal, few households have sufficient land area to achieve food self-sufficiency. "Six months of eating one's food, six months of searching for food" is how one peasant hill farmer described his situation in the course of an interview. His harvests supplied the household with just six months of staple grains, and each year he had to "search" for extra supplies.

An anthropological study of household response to food shortage shows that the particular strategies adopted are a marker of social and socioeconomic status. In-depth interviews of 120 randomly selected households were conducted in four villages of western Nepal (Gulmiuand Arghakhanchi district), with proportional representation on the basis of land holdings and caste. These interviews uncovered the following five main courses of action and their specific social and economic contexts.

1. Emigration

Temporary emigration is widespread, prompted by extreme poverty or the desire for a better life. Cash from outside earnings enables a family to buy foodstuffs, hire labor, and payoff loans. Some migrants will return without a penny, but in any event their absence has reduced the number of mouths to feed at home. Prolonged absence and employment can result in a steady income, but leads to a shortage of manpower for female-headed households. In the words of one Nepali woman, "When the man is at home, it's easy work; when he is away, it's easy money".

The type of work sought is tied to social factors, especially caste and educational level. Thus, men of Tibeto-Burman origin aspire to a military career and a regular pension. Most applicants find themselves rejected by the army, and turn to the "civil service", looking for employment as cooks, night watchmen, drivers or laborers, as far away as Bombay or Calcutta. In contrast, the high caste Bahun-Chetri seeks high-status positions in government or finance, while the low-caste artisans restrict themselves to temporary or seasonal employment.

2. Wage labor

The opportunity for in-village wage labor varies enormously with the ecological and social circumstances of actual communities. In predominantly Tibeto-Burman localities, which tend to be high-altitude areas with limited agriculture potential, each family cultivates its own terraces during the same season, and there is little possibility of working for another household. By contrast, in multi-caste localities, a pronounced economic disparity between high caste landowners and artisans creates a supply and demand for wage labor.

3. Other income

In rural areas, grains is bartered rather that sold, but new families produce a local surplus. However, the sale of livestock and other animals is a handy source of cash, and this strategy is encouraged by funding from organizations supporting a "Small Farmer Development Program". Again, different castes specialize in the sale of various products: some make straw or bamboo handicrafts, others sell alcohol (the avoidance of alcohol distinguishes pure castes from (Nepali: *matwali*) alcohol-drinking castes, while artisans are sharply differentiated as blacksmiths, tailors, potters or musicians, each on an echelon in the caste hierarchy. Of course, the high castes and artisans are interdependent, and client-patron relationships eventually tie given households in a tight web of credit and labor obligation.

4. Loans

The volume of money changing hands through credit transactions is striking. Loans are taken out to purchase food for consumption, to invest in land and livestock, or to meet a crisis of some sort. Families in rural Nepal divide themselves into those that merely cope with an adverse situation, and those that are able to rise above it through judicious use of their resources ("coping" or "investing" strategies).

Moderate borrowing is a common strategy for poorer or female-headed households, actually preferred to complete financial independence because it establishes a credit line that can be drawn upon in an emergency. These loans can be repaid in labor during times of peak agricultural activity. But for very poor households, debt can become a dangerous whirlpool, swallowing up their land and animal resources. A Nepali proverb puts this quite simply: "Once an ear is lopped off, the other is soon to follow."

5. Change of diet

In periods of food shortages (Nepali: *anikal*), families change their staple diet, but among poor households the shift – paradoxically – is from boiled maize flour to prestigious white rice. Maize is nowhere available to buy, so rice is imported from nearby towns, a situation which underlines the dependence of these areas on a market economy. Intrahousehold food allocations can also change, although Tibeto-Burman households boast of no practices that discriminate against daughters-in-law or young children. Local people remark that the richest households (high caste) are those that tighten their belts to save or lend grain, while others (Tibeto-Burman) consume all the grain and meat that come through their door.

In brief, rural households in these densely populated areas of western Nepal experience recurrent food shortages, but not a true "hungry season" in contrast to regions of West Africa. These Nepali households eat as much food as they can buy, and will buy food even if this means going into debt. Their true problem is not a shortage of grain, but a lack of solvency. This emphasizes the importance of external revenue and the credit and labor relationships between households. Villagers survive by adopting a whole range of strategies to assure them of income and food in times of difficulty. The particular strategy employed is closely related to a household's caste and socio-economic status, and further reinforces its standing in the community

Source: Panter-Brick C. In Wiessner P, Schiefenhoevel W (eds), 1998.

Learning Activity 4.1.

Task: Choose a general population

- Create a time line (over one year)
  - When are staples produced
  - Are there periods of scarcity
  - Seasonal and festival foods
- How is food consumption affected by these changes
- How are other behaviors (hygiene or illness) changed over time
- Coping strategies during:
  - seasonal or short term food shortage
  - long term famine

Learning Activity 4.2. Fuel scarcity will somehow influence daily dietary pattern.

Task: Explain the sequence of typical daily dietary pattern during fuel scarcity in urban and rural settings

	Adequate fuel availability	Marginal fuel availability	Fuel shortage	Severe fuel shortage
Breakfast				
Lunch				
Snack				
Dinner				

References

Abdullah M, Wheeler EF. Seasonal variations in the intrahousehold distribution of food in Bangladeshi village. Am J Clin Nutr 1985; 41: 1305-1313.

De Garine I and Harrison GA (eds). Coping with Uncertainty in Food Supply. Oxford: Clarendon Press, 1988.

De Garine I and Koppert G. Coping with seasonal fluctuations in food supply among the savannah population the Massa and the Mussey of Chad and Cameron. In Coping With Uncertainty in Food Supply. De Garine I and Harrison GA (eds). Oxford: Clarendon Press, 1988.

Den Hartog AP, Van Staveren WA and Brouwer ID. Food Habits and Consumption in Developing Countries: Manual for Field Studies. Wageningen: Wageningen Academic Press, 2006.

Panter-Brick C. Food and household status in Nepal. In Wiessner P and Schiefenhoevel W (eds). Food and the Status Quest: An interdisciplinary perspective. Oxford: Berghahn Books, 1998.

Wheeler EF and Abdullah M. Food allocation within the family: Response to fluctuating food supply and food needs. In Coping with Uncertainty in Food Supply. De Garine I and Harrison GA (eds). Oxford: Clarendon Press, 1988.

CHAPTER 5

Household, gender, and food distribution

Judhiastuty Februhartanty and Achmad Fedyani Saifuddin

Objectives:

1. To emphasize the significance of food and eating within the private sphere of the family and household.
2. To explore power differences between men and women, and parents and children.
3. To discuss food distribution within households.

5.1. Introduction

Individuals eat food, but it is mostly purchased and prepared at the household level. After food is prepared and prior to eating, there is intra-household allocation, where individuals get their share of the household's food. Intra-household food allocation (IHFA) follows cultural norms which include assumptions about the quantity, type and quality of food to be given to men, women and children (Rizvi, 1978 in Wheeler, 1991; Wheeler & Abdullah, 1988). Studies of IHFA involve measurement of the food intake of all household members and the analysis of household members' shares of the total (Wheeler, 1991).

Even in industrialized societies, where food is often eaten outside the home and not in family groups, there are occasions when IHFA is important as a social activity. When food supplies are limited and inadequate, IHFA is one of the household's survival strategies. IHFA is a research area where nutritionists and social scientists meet with the common question: 'Who gets what, and why?' One of the features of the literature dealing with IHFA is that few nutritionists have worked in this area, and that many of the statements on IHFA are not backed by quantitative measurements of food intakes. The validity of statements such as: 'more food will be served to him [the head of household] as a token of respect and appreciation' (reported by Chimwaza, 1982 in Wheeler, 1991) can and should be tested, as can theories as to the impact of food shortage on the sharing of food within households. The relative shares of family food received by men, women and children must have impact on their nutritional state, and this is a research area where nutritional techniques are highly useful (Wheeler, 1991).

5.2. Household vs Family

First of all, it is important to discuss the concepts of household and family. According to Saifuddin (1999) family and household are two concepts that have been blended into a single notion in most of the texts on kinship and social organization in the past because in many instances they have interchangeably functions in many developed societies in which nuclear family type is the main reference. Furthermore, Messer (1983) stated that by contrast, nutritional and health surveys using the "family" or "household" as their unit of record have in most cases not dealt with the complexities of domestic organization or considered how variable family and household social relationships affect nutritional and health outcome of domestic units.

But the situation is much different if we approach our developing societies – with special emphasis, urban societies – in terms of vastly and hardly social and economic changes. The purpose of family and household distinction is for analysis. Household in its flexible form provides more promising space for dynamic social and cultural research, especially in our society than the classical family concept. Selecting household as a common focus for social and cultural research and analysis has both practical and theoretical justifications (Saifuddin, 1999).

Social networks beyond the local co-residential group, which also share production and consumption activities relating to food, may affect the food intakes of individual members of such families or households. Economic, kinship, and other social rules and conditions, considered in conjunction with culturally appropriate attitudes toward giving and taking food, may furthermore affect composition of co-residential groups and who eats where, what, and with whom (Messer, 1983).

According to Jenkinson (1998) a household comprises either one person living alone or a group of people, who may or may not be related, living (or staying temporarily) at the same address, with common housekeeping, who either share at least one meal a day or share common living accommodation (e.g. a living room or sitting room). Resident domestic servants are included. Members of a household are not necessarily related by blood or marriage. Households may contain one or two or more nuclear families within them, but also household members other than members of the nuclear family, such as more distant relatives, friends, foster-children, lodgers, flatmates or long-stay guests or visitors.

In the past, when anthropology research tradition was primarily on simplex and less change society, household was not their focus of attention. They did not distinguish the family from the household because both are institution sensitive to short term socio-economic fluctuation, and instrumental to adaptive mechanism of the household member. The family, and therefore household, is considered as the center of life. The family itself is a concept derived from evolutionary perspective containing much with cultural values and norms.

As complex adaptive mechanism of the family to social and economic change has increasingly been the concern of social and cultural researchers, attention to the domestic function of the family which household has been intensified. Our need to approach the smallest social unit as household has come to term. Both become two basic concepts with different starting points and different total notions. Even though family and household are culturally defined but the family is conceived in descent and kinship terms which are not necessarily related to residential place. Household includes people who are not kin living together in some extent of cooperation. This covers helpers,

gardeners, driver, and so on who live together primarily because of any economic and residential reasons.

At the very basis is the need for an explicit recognition of the diversity in structure, composition, and function of households under various socio-cultural and economic environments. Interesting insights have been provided by anthropological investigation into the various dimensions of household units. The paper by Messer (1983) shows some of the variations in household-provisioning mechanisms adopted by household units under diverse sociocultural conditions (Kumar, 1983).

5.3. Gender: Living Condition, Division of Labor, Access to and Control of Resources

Gender (as distinguished from 'sex') denotes a social-structural feature: gender roles are biologically determined to a limited extent only; they are for the most part socially constructed. Their respective roles are assigned to men or women in a given society and at a given time on the basis of various factors (social, cultural, ideological, religious, ethnic, economic, etc.) 'Female' and 'male' role allocations therefore differ from one society to another and within societies. In nearly all societies, these role allocations specify a subordinate social position for women. However, because it is socially determined, this status can be questioned and changed (Günther and Zimprich, 1998).

(j)

Figure 5.1. Typical workloads of a rural African woman

The gender approach focuses attention on the different social roles and duties of men and women: i.e., productive, reproductive and community-related functions. These are linked with unequal access to resources, income, institutions and political influence. As a result, women and men have different needs, just as they have disparate chances to express them. As gender-specific situation analyses show in most cases it is the women who find themselves in the more difficult socioeconomic situation and who have a lower social status. Here the gender approach distinguishes between practical and strategic interests. The practical interests of women and men (such as health care for the family, infrastructure, etc.) relate to a concrete improvement in their lives. Strategic interests, on

the other hand, relate to an improvement in the social status of women and a change in the gender division of labor and resources, as well as in their opportunity to participate in and influence the political process. In reality, however, practical and strategic interests often overlap or merge. The solution of practical problems - for instance, increasing income - can therefore at the same time contribute to strengthening women's self-confidence, increase their mobility and autonomy and thereby support a change in the relationship between the genders (Günther and Zimprich, 1998).

Among the topics that have been investigated for purposes of advancing economic development in developing nations have been the social organizations of production at the household level and its relation to nutrition, health, and fertility. In particular, the role and nutritional consequences of women's work in food production, preparation, and distribution and women's time allocation to household maintenance and child care versus cash employment have been dealt with in any number of policy studies. Messer (1983) in her review stated that public health economists have done some considerable works in a growing literature on women's and children's work, time allocation, and possible implications for nutrition and fertility decision-making on the relationships between nutrition, productive behavior, and reproductive behavior at the household and community levels. The review found that the extra income of the mother may be the main economic factor accounting for lower levels of malnutrition within populations where some mothers work as traders. However, on the other hand, the mother's time away from household responsibilities, in the absence of adequate supplementary domestic and child-care arrangements, may account for the poorer nutritional status of the child. This disadvantageous nutritional outcome may stem from economic demands on the mother's time, which leave her inadequate time to prepare a balanced diet to meet children's nutrient needs. Alternatively, the child may suffer hunger, exposure, and illness while the mother works, and therefore be at greater nutritional risk than the child of a woman who is not working. As indicated above, the particular skill of the mother at managing work and child care, along with the cultural mechanisms for providing surrogate mothers of greater or lesser quality, are also significant factors in nutritional and health outcomes, and there may be significant intracultural variation in these matters (Messer, 1983).

a. Living conditions in the village and status within the family

Women, children and young people are the household members most likely to be involved in household chores including fetching water and firewood, bringing the harvest in, taking grain to the mill, taking harvest products to market, transporting sick children to the doctor, etc. While an inadequately developed infrastructure considerably increases demands on people's time and strength, a well-developed infrastructure saves both for other activities. In many cases, external actors have already supported approaches to village development in a particular village or its immediate vicinity/region. To coordinate various activities, to further develop existing approaches and to avoid repeating failures, it is worthwhile to analyze the experience they have gathered. A pertinent example would be the practically countless projects for introducing grain mills and the equally extensive studies of their success or lack of it. The conditions under which a mill can be profitably operated have been more or less exactly defined for years. Also well-known are the problems that arise from communal operation and the fact that use the mill gets will depend essentially on the size of the fees

(Ceesay-Marenah 1992 in Günther and Zimprich, 1998). It is only recently, on the other hand, that donor organizations can be seen to draw the corresponding conclusions from these facts.

Social authorities are bound by the traditional conception of men's and women's roles to various extents. Therefore the influence they can have on improving women's social status (empowerment) also varies. Conflicts arising in this area should be analyzed or inquired into with caution. Recourse must almost always be had to indirect questioning and methods.

Socio-cultural aspects play a central role in achieving the project purpose and implementing individual activities. From a woman's viewpoint, customs and traditions can affect her situation in life, depending on which social values obtain, positively or negatively (restriction of her productivity and/or freedom of movement).

The living conditions of women and men in rural areas are significantly influenced by variations in their family status. Here it should be taken into consideration that, particularly in Africa, a large - sometimes polygamously-structured - family, rather than a small one, must be assumed to be the central social unit. As a rule, very different rights and duties are assigned to individual family members. As regards status within the family, the structure of the family and individual freedom of movement /mobility are especially significant factors.

The material circumstances of the family often decisively shape the social and economic situation of its women. This is true whether or not they have any personal control at all over the family income or share in it.

Processes of social change often cause family structures to change and, increasingly, to break up. This has impacts both on the gender and the overall social division of labor as well as on the family status of women and men.

As can be observed in many societies in developing countries, the woman's contribution to earning a family living takes on added significance precisely at the time the family finds itself in an economic crisis (unstable income, etc.) On the one hand, this increases the burden on women; on the other, it is frequently associated with growing efforts on their part, as they face more duties, to win more rights as well.

b. Gender-specific division of labor

Role-sharing and working conditions are not static, but are continually being redefined in the wake of processes of social change. Tasks, for example, that used to be done communally by the villagers are now done for pay - poorer villagers work for richer ones. With labor becoming scarcer, cost-effectiveness grows in importance: buying processed rice to prepare meals can sometimes be more economical than the labor-intensive husking and cleaning of rice in the home. This is true, for example, when women can utilize the energy and time involved more cost-effectively in field work.

As a result of a progressive disintegration in existing family structures both in rural and urban settings, changes are also taking place on the level of the gender division of labor, often at the expense of women. The tendency is for women, besides their traditional household tasks - such as the time-consuming and strenuous fetching of water and firewood - to be more and more bound up in the sort of work for which men were formerly responsible.

How work is divided and organized by gender within the family is closely related to the size of the family and to the availability of, as well as the amount of work

needing to be done in, women's own separate fields. The disintegration of the extended family and the transition to the nuclear family often results in a shortage of work capacity within the family, so that the woman's help in all aspects of field work is needed more. If the women have fields of their own, the men expect them, as a rule, to cultivate them alone or with the help of their children - although helping in the men's fields generally takes priority over this. The changes in family structure that have been outlined are accompanied by reduced willingness and capacity on the part of the men to act supportively.

In many cases, women have other sources of income than do men. In order to secure or further develop specific income sources, limiting factors such as lack of capital, restricted mobility, or unclear market factors must be eliminated. Income-producing activities are highly significant for women because of their increasing financial obligations. Their motivation and readiness to act tends to rise if they have independent control over how goods produced are used. This should be qualified by noting that these income-producing activities should not - as is frequently the case - be linked to increased workloads for women.

It should also be taken into consideration that sometimes negative side-effects, such as effects on health or the level of education, accompany income-producing activities. Measures that save time and reduce work in the area of unpaid activities (elimination of hand-grinding of grain through introduction of mills, lessening time and effort spent seeking firewood through use of energy-saving stoves, etc.) can enable women to engage in more income-producing activities. However, the extent to which this in fact really happens depends in turn - apart from the possibilities at hand - principally on the social status of women and men, and is also a question of gender-determined relative strength. The introduction of work-saving technologies can also have a counterproductive impact, as the following example from Senegal shows.

The Mill

after a story by Fatime C. Ndiaye (CONGAD INFOS No12/1991)

As she hears the announcement on the radio, Maimouna remembers with what enthusiasm she had formerly spoken to the women of her village, how convinced she had been that they should join in the project, her project. She believed that the millet mill would mean they could sleep another hour and take a literacy course. The water pump would give them time for a chat and they would be able to meet more often under the kapok tree to do each other's hair.

Maimouna would have more time for her vegetable garden and her little field. At night, she reckoned up the additional income in her head and imagined all the things she would do with it. She wanted to begin modestly, because the first earnings would surely not be all too plentiful. First, the garden fence was to be repaired and the children were to get new clothes. But then, when the vegetable garden and the larger field returned larger yields, she would buy the silver bangles she had always wanted and would go to Dakar. Dakar, city of lights. In Dakar she would visit her aunt, who would be astonished at the many presents her niece would bring her, and that she could read the newspaper now! Her aunt would be sorry she had left the village so soon.

Time has passed, and Maimouna no longer pounds millet. Nor does she have to walk for kilometers any more to get firewood and water. Instead, her husband now makes her work in his fields, digging weeds and watering his vegetables. She has not been able to enlarge her own field. The council of elders has given her to understand that she has no claim to land, that she can be well-satisfied with what she has received from her husband.

Still, she now has the most beautiful garden in the village and has even been congratulated on it by the project and the prefect. But nobody has asked her what has happened to the money from the vegetables it produced, and if they did,. she wouldn't have had anything good to report. Since she has a few pennies more, Karim won't buy schoolbooks and clothing for the children anymore. He won't even pay for the spices in the couscous now. That is so embarrassing to Maimouna that she can hardly admit it even to herself. Lately Karim even thinks she should also buy his tobacco and cola nuts. Thanks to Maimouna, he has saved a lot of money, so he can marry a second wife sooner than planned - the ox has already been bought.

But why complain. The whole village is full of praise for Maimouna's courage and energy. She is held to be an example for all women who are not content with their lot. The broth boils over. Maimouna forgets her dreams; she must wake the children. In her village they say that there are only two possibilities for women: "*Mut mba moot*" - submit or go. But where?

Source: Günther D and Zimprich EZ, 1998

c. Access to and control over resources

Although women play a central role in agriculture and also in the post-harvest sector in particular, in comparison to men they have less access to material and financial resources (land, means of production, or money in form of credit or something similar) and services (use of labor force, etc.) For example, land titles are for the most part issued in the names of heads of households - mostly men - and therefore women frequently have only indirect access to land, through their fathers or husbands.

Next, access to financial resources in particular will be more closely examined: at the outset of their marriage, women who do not come from prosperous families often have at their disposal only a small amount of starting capital. They invest this mostly in processing and / or small-scale trade, just as they do any profit realized. Often the meager capital is used up in a short time through business failures or following pregnancies. In such situations, women still have some financial means left only if banks or savings and loan associations allow them access to credit.

Traditionally, there are well-functioning savings and loan associations in nearly most countries. Here the combination of credit cooperatives with individual credit use has proved relatively successful. Less successful, on the other hand, are the collectively financed and operated facilities such as mills or grain banks - whether their management is in the hands of men, women or mixed groups. Among the factors in play here are organizational shortcomings, too little sense of responsibility, conflicts over repairs, uses of reserves and profit, one-sided personal gain, and lack of profitability compared to private one-person operations.

Besides their superior access to resources, in many cases men also have the right to dispose of and control property in form of land as well as monetary funds and other resources. Moreover, they frequently exercise control over goods produced by their wives / womenfolk, mothers and daughters.

Along with increasing demands on women's time, changes are taking place on the level of family financial obligations, which tend to be redistributed at the women's expense. Women's contribution to family upkeep economically is growing ever more significant. In most West African societies women manage their own fields and maintain their own stores. Formally, they also have control over what they have produced and stored (Günther and Zimprich, 1998).

Patriarchy is the structuring of family units based on the man having primary authority over the rest of the family members. It also refers to the role of men in society more generally where men take primary responsibility over the welfare of the community as a whole. In these societies, in general, women are politically, economically, socially, and ideologically devalued and disadvantaged and they lack control of economic resources and power, and are deemed morally and physically inferior to men (Counihan, 2005).

5.4. Food Distribution and Allocation

Wheeler (1991) examined intrahousehold food and nutrient allocation in Asia, and in the context of chronic food shortages. These studies shed light on the debate about the treatment and dietary problems of different age-sex groups, and the basis for norms of food allocation, not only in one continent but generally. Intra-household food allocation (IHFA) studies are not just an expensive way of finding out which age-sex groups suffer the most from malnutrition or over-nutrition. Like many dietary studies, they illuminate the process by which observed malnutrition occurs. Specifically, they can confirm or refute popular views on the relative feeding of different age and sex groups. For example, it is common among nutritionists and others working in South Asian countries that women and children suffer because they rank low in the distribution of nutrient-rich foods (Gopaldas et al. 1983; Sen and Sengupta, 1983 in Wheeler, 1991). An IHFA study can ask to what extent one age-sex group receives less of a food or nutrient, and how much difference this makes to the satisfaction of nutrient

requirements. Such studies are increased in value by the addition of the social dimension and by awareness of the cultural and economic forces driving the allocation process, and the rationale given by households for their behavior (Harriss & Watson, 1987; Senauer et al, 1988 in Wheeler, 1991).

Theoretical framework for analysis of IHFA

Differential food allocation does occur; at the simplest level, most adults are given more to eat than most small children. The phenomenon has been discussed using three models, which may be designated 'functional ', 'cultural', and 'resource-control' (Wheeler & Abdullah, 1988).

A 'functional' or 'physiological' model of food allocation regards the household as a unit whose overall aim is to survive and to reproduce itself, and which allocates resources to that end. Thus, a ranking of 'productiveness', the capacity to earn, or to produce goods, would be the scale against which decisions were made on food allocation. This model would predict that in times of plentiful food, approximately equal shares would go to all household members, with a progressive favoring of the most 'productive' members in times of shortage. In the Tamil Nadu Nutrition Survey (Cantor Associates, 1979 in Wheeler, 1991) it was found that the overall pattern of IHFA did not vary with economic status, but seemed to be related to perceptions of work capacity based on body size: 'It appears as though food was allocated according to the relative two-dimensional size of family members... [there was] lack of perception of additional food needs for growth, for reproductive function in the female... Lactating women were perceived as non-productive' (Cantor Associates, 1979 in Wheeler 1991). In this model, the children of the family are seen as future producers, (if they are not already working), and sex discrimination may be expected if daughters leave the home at a relatively early age, and after only a short period of contributing to the family work-force.

A 'cultural' approach to food behavior in a given society regards the system of production, preparation and distribution of food as a model of the structure and relations of that society. Social categories are continually expressed and redefined through the presentation and exchange of food, and in the prioritization of access to food(s). The status of an individual in the household and in society is reflected in the amount and kind of food eaten, and in the extent to which individual tastes and preferences are met (Atkinson, 1980; Douglas, 1982 in Wheeler 1991).

A 'resource control' model focuses on the material and power relations among household members: 'Inequalities of power between husband and wife become manifest in the various arrangements by which the goods, services and/or income of both husband and wife are allocated. Overall, a woman's effective possession of the resources she had either produced, or earned, within the household is determined by her power *vis-à-vis* other household members, especially her husband' (Whitehead, 1981 in Wheeler 1991). Here again, food allocation is taken to reflect the hierarchy of a household, but the focus is not so much on how food follows status, as on who controls the food resources and/or the food budget. Access to food follows the general pattern of material relations. The 'cultural' model would predict, in the majority of societies that men and older adults, would have priority over women (especially young women) and children, since the majority of societies have a patriarchal element. In the 'resource control' model, earning, or productive capacity, gives control over foods: thus, where women have more wage earning or productive opportunities, they would be expected to have better access

to foods. However, where men control the products of women's labor, as well as their own, they would again have priority. Children hardly enter the picture of control over food, since what they earn or produce is generally regarded as a resource over which adults have rights.

The 'functional' model assumes that there is a food allocation system which relates to productive capacity: here, working adults of both sexes would rank highly, followed by children, the old, and any other adults regarded as unproductive. In times of shortage it would be logical to divert a higher proportion of scarce resources to productive members, in order to ensure family survival. Productiveness should logically include women's capacity to produce the next generation of labor. Thus, all three models suggest that adult working men are likely to fare well in food allocation, but there is some divergence as to the likely priority given to women, children, and elderly non-productive adults.

In actuality several of those frameworks contribute to the overall household allocation of foods. Also some statement should discuss that while there may be economic decision making by the males in households, food distribution may be in the hands of women.

Van Esterik (1985) presents in her review an exploration of the dynamics of intrafamilial food distribution as an adaptive strategy. This framework, which includes both biologic and sociocultural contexts and focuses on the decision-making process, regards women as the key actors and identifies the household as the most suitable level of analysis. The key components of the decision making process for intrafamilial food distribution are:

- household resources
- food classification systems
- characteristics of individuals
- commensality system
- food consumption system

Although the research evidence in this area is inadequate, it can be stated that food is not equally divided within households and reflects instead the order of precedence and social value of the food consumers. Although differential malnutrition and differences between males and females, and children and adults, in the prevalence of deficiency diseases suggest a misdistribution of food within households, it is important that intake be evaluated in relation to shifts in nutrient requirements on the basis of age, sex, life stage, and energy expenditures. To overcome the difficult task of determining the total food intake of family members, focused research on food products that are not shared proportionately within the household should be considered. Gender not only appears to have a direct effect on the allocation of food, but also indirectly affects infant and child feeding. A long term solution to inequities in the distribution of food is to support those policies and programs that aim to raise the status of women. Nutrition education is likely to be effective only if program developers determine whether distribution problems are caused by income constraints, time constraints, or a lack of information about appropriate foods.

Concepts and practices related to food allocation to rural Peruvian children

Ethnomedical and developmental concepts

The ways that Ura Ayllinos care for and feed their children are related to the prevailing concept that their health, bodies, and well-being to be in constant state of threat from forces that surround them, both natural and supernatural. Illness is thought to be caused by natural forces, such as heat, cold, and wind, and supernatural forces that enter the body and install themselves in a particular body part. Poor health is represented by the core concept of *debilidad,* meaning weakness or vulnerability, and illness prevention practices center on maintaining *fuerza* or strength and avoiding weakness. As found in other Andean communities, key preventive concepts in Ura Ayllu involve the maintenance of balance through proper dress, management of negative emotions, and the appropriate intake of food and liquids.

Foods are classified by their inherent properties of heat and cold. All these qualities (heat, cold, wet, dry) are considered when preparing meals and feeding children. A full stomach is like an invisible guard that protects the body and prevents illness. For children, hunger is kept in check by eating frequently. As one Ura Ayllu father of seven explained, a child's health can be maintained simply by keeping a child warmly dressed and well fed.

Food allocation to children: Frequency of eating

The perception that children should be well fed and not experience hunger is seen in the ways most Ura Ayllu women feed their children. Mothers recognize the immature status of their young children and attempt to minimize their exposure to illness and hunger. One of the ways hunger is avoided is to feed children more frequently than the other household members. This eating patter is more similar to the structure of breastfeeding with its frequent feedings than the ordinary scheduling of meals in Ura Ayllu. Toddlers eat the same foods as adults, but their eating pattern is structured and timed differently from that of adults. Young children are considered incapable of conforming to the timing of family meals that occur only two or three times a day. Children are thought to be incapable of consuming sufficient amounts of food during a meal to get them comfortably through the period between meals. Thus, many women state that food should ideally be accessible to young children for snacking throughout the day. Mothers who plan to be absent for several hours will leave the kitchen door unlocked so that children can help themselves to the pots of potatoes or other foods left for them. Potatoes and other tubers that are easy to handle and to chew are favorites to young children.

Source: Graham M,1997.

Parents' and children's preference diverge

- Food that according to the parents is good for the children's health, but unpopular with children; and foods that are favored by children but disapproved of by their parents.
- Parents' perception:
  - 'healthy food' like green vegetables
  - 'unhealthy food' like sweets and snacks

In theoretical terms, discussion of gender which deals with distribution of food has to be undeniably linked to the issue of power. There are many studies that link the control of food to political and economic power. In his comprehensive historical study, *Famine,* Arnold (1988) claims that "food was, and continue to be, power in a most basic, tangible and inescapable form". Lappe and Collins (1986) argue that hunger is the clearest sign of powerlessness, for hunger means one lacks the control to satisfy one's most basic subsistence need. The authors also point out that women very often suffer hunger and famine more severely than men because of their socioeconomic and political subordination in many countries of the world.

In the past, socio cultural hierarchies based on class, caste and gender are maintained through differentiate control over and access to food (Goody 1982). Different consumption patterns are one of the ways the rich distinguishes themselves from the poor and men from women (Mintz 1985). Many studies show that men eat first, best and most. In *Sweetness and Power* (Mintz 1985) described at length how control of sugar production and consumption contributed to class hierarchy and colonial dominance but neglects consideration of gender.

In activity terms we observe that women play a critical role in achieving household food security. It is usually the women who grow the food the family eats. They take care the plants keenly and thoroughly right from the start. They choose which foods to purchase in the marketplaces and find ways to feed the family when supplies run low, for example during dry season. They also play important role in generating income through the sale of foods they produce. Women typically have limited access to land, education, information, technology, and decision making forum. They also have primary responsibility for child rearing and rely on developed social networks that act as an informal safety net for the social unit in times of crisis.

A question may be raised: Why do women favor justifying their position as men want them to do so? This is about gender and culture. Gender is culturally constructed distinction between men and women. The construction does not only establish two different domains of social life between them but also affect their roles to construct nutrition. The cultural constructions of gender interact with biological domain and needs which in turn affecting nutritional status of the entire family or household. Since women's cyclical loss of iron and childbearing, their nutritional status is particularly vulnerable to deficiencies in diet, care, and health or sanitation services.

Finally, an economist stated that: "In recent years our understanding of household behavior as it affects food consumption and nutrition has been greatly extended. This new evidence can serve as an improved guide to policy choice." (Senauer, 1990 in Wheeler, 1991). Yet a nutritionist who takes a critical attitude to the data will conclude that it is impossible at the present time to give an authoritative and comprehensive answer to the question "*Under what circumstances are women and children discriminated against in food and nutrient allocation?*", although the data have allowed some tentative conclusions. Although the broad pattern of allocation among men and women seems to be consistent there are a number of unanswered questions, which call for careful measurement of food intakes as well as behavioral observation.

- *How does food allocation proceed in female-headed (e.g. lone-parent) households, especially if there are teenage boys?*
- *Where a woman is the 'breadwinner' of a household, males being unemployed or incapacitated, how does food allocation reflect the socio-economic situation?*

- *Where young children are economically active, are they rewarded with adult-style food allocation?*
- *What happens in situations of moderate and severe food shortage?*
- *What is the nature of allocation of food to aged family members, and does it reflect the prestige of old age in different societies?*

Attempts to answer the above questions will not only shed more light on the social dimensions of nutrition, but will contribute to the formation of food and nutrition policy (Wheeler, 1991).

Summary

Gender bias is noted in social and economic status, occupation, access to education and health services, and food allocation. Gender bias my be attributable to reasons of religious, economic or cultural origin and is more likely to be common in Asian societies and in patriarchal societies.

Some consequences of gender bias related to health may be differences in mortality, morbidity, nutritional status and mental development. These differences may be exacerbated by conditions of seasonal scarcity, famine or chronic poverty.

In areas where women's economic productivity is high, gender bias may not exist or may be less common.

In addition, such a bias may exist among children as compared to their adult counterparts in the family/household. This may be a result of socio-cultural understanding on household productive measures which dominantly engage the adult family members.

Case study:

How Women and their Households Cope with Food Insecurity in South Asia

An IFAD (International Fund for Agriculture Development) study undertaken in 1998 reviewed the question of food security under three projects that the Fund had supported two in India and one in Nepal.
Among the key questions were how women coped with food shortages and the impact of the projects on the women themselves.

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The study found that, in spite of some improvement, there were continuing household-level and external challenges to food security. In two of the projects, the study noted a total food consumption increase among the majority of households. It also found that, overall; the proportion of the most- food-insecure households (defined as those unable to consume sufficient cereals for more than three months) was reduced from one in five to one in ten over a five-year period. But the proportion of most-food-secure households (defined as those consuming enough cereals for more than nine months) had also been reduced. Households falling into the middle category (those consuming enough cereals from three to nine months) increased from 44% to 58%. Overall, cereals consumption had increased for nearly half the households but had declined for about a third. In terms of cereal and non-cereal food consumption, just over fifty percent of households reported an increase, while only a quarter reported a decline. Although food security had generally improved, the majority of households still did not have enough food to last the full year.

The poorer and single-livelihood households found it particularly difficult to find ways of feeding their families, especially during the lean periods of the year. They tended to use a number of different coping strategies, such as selling smaller animals; borrowing money from moneylenders; performing wage work (for women and men); mortgaging land; underselling products to get quick cash; performing small income-generating activities such as collecting and selling fuel wood; and calling on children's labor.

Women were the most involved in finding ways to deal with food insecurity. The study noted several ways that women coped with the acquirement and utilization aspects of household food security. Several of women's coping approaches were at a disadvantage to the women and had a negative impact on their health. These included:

- reducing their food intake and the intake that of their daughters;
- sharing food surplus between households;
- using food that expanded in the stomach (e.g., gruel), especially for themselves;
- cooking food only once a day and using side dishes in order to reduce the fuel used and time spent (freeing up time for earning an income);
- consuming processed foods that kept without special storage (dried vegetables, flour of mango kernel);
- purchasing cheaper staples to replace costlier and more nutritious items; and
- working harder and longer on productive activities to earn cash for buying food.

Strategies for coping with food shortages varied between countries. In the study area in Nepal, they included:

- keeping some livestock for milk and butterfat;
- storing grain for up to five months on average;
- borrowing grains within the village (mainly from members of similar castes or from

relatives);
- borrowing grain from private traders or from landlords, often at very high rates;
- sharing vegetables or meat within the village if someone had a surplus;
- processing of food;
- using edible forest foods;
- participating in intrafamily food distribution practices, with men and women eating different foods and/or women eating much less than men or children during the lean season

However, while women frequently lose out in the intrafamily distribution, this is not the case with all ethnic groups. For instance, another IFAD study in Nepal found that among the Praja in the upper hill slopes of the Chitwan District, the family shared food in equal amounts, including food for the children. When the woman was pregnant, she even received an extra 'foetus share'. Here, women do not even necessarily wait for the men to come home before beginning their meal. But this is an exception rather than a rule.

In line with traditional patterns of intrahousehold food allocation, women often deprive themselves. After the harvest, when surplus food was available, they sometimes ate almost as well as the rest of the family, except where the structure of upper-caste conjugal units and behavioral norms (as in Nepal) required them to eat different types of food. But during the part of the year when food was scarce, it was not unusual for women to eat gruel twice a day (even in Tamil Nadu), eat powdered mango kernel (in Andra Pradesh) or eat nothing but maize bread and salt, or to starve twice a week – sometimes along with their families (in Nepal). Even better-off households reduced the consumption of vegetables, pulses and oil during lean periods, especially for women. Commonly, the time of greatest food stress for women tends to coincide with the time of year when they have to spend more time and energy on household and productive tasks.

While women use a number of strategies for coping with food insecurity, these are often the most disadvantageous to the women themselves. The periods of food insecurity and the coping strategies used need to be taken into consideration by development projects.

Source: http://www.ifad.org/hfs/learning/11.htm. Accessed on 6 July 2009.

Learning Activity 5.1.

Task: "Role Play"

What are some reasons women and children are discriminated against food?

1. What are ways to overcome this discrimination
2. Debate (women vs men) must argue for the other side
3. Come up with a strategy to address gender discrimination in food distribution/intake

References:

Arnold, D. Famine : Social crisis and historical change. New York : Basil Blackwell, 1988.

Beardsworth A and Keil T. Sociology on the menu: An invitation to the study of food and society. London: Routledge, 1997.

Counihan CM. The anthropology of food and body: gender, meaning, and power. New York: Routledge, 1999.

Counihan CM. Patriarchy and female subordination. In: Counihan CM and Kaplan SL (eds). Food and gender: Identity and power. Taylor & Francis e-Library, 2005.

Graham M. Food allocation in rural Peruvian households: Concepts and behaviour regarding children. Soc Sci Med 1997; 44 (11): 1697-1709.

Goody J. Cooking, Cuisine, and Class: A Study in Comparative Sociology. New York : Cambridge, 1982.

Günther D and Zimprich E. Gender-orientation in the post-harvest sector: Pointers for identifying gender-specific aspects in the post-harvest sector. Eschborn, Germany: GTZ, 1998.

Jenkinson C. Measuring health status and quality of life. Question Bank Topic Commentary on Health: University of Surrey, 1998. Available at http://qb.soc.surrey.ac.uk/topics/health/jenkinson.htm. Accessed on 25 July 2009.

Kumar SK. A framework for tracing policy effects on intra-household food distribution. Food Nutr Bull 1983; 5 (4). Available at http://www.unu.edu/unupress/food/8F054e/8F054E00.htm#Contents. Accessed on 25 September 2009.

Lappe FM. and Collins J. World unger: Twelve myths. New York : Grove Press, 1986.

Messer E. The household focus in nutritional anthropology: An overview. Food Nutr Bull 1983; 5 (4). Available at http://www.unu.edu/unupress/food/8F054e/8F054E00.htm#Contents. Accessed on 25 September 2009.

Mintz S. Sweetness and Power : The Place of Sugar in Modern History. New York : Penguin, 1985.

Saifuddin AF. "Keluarga dan Rumah Tangga: Satuan Penelitian dalam Perubahan Masyarakat". Jurnal Antropologi Indonesia 1999; 60, Th.XXIII, Sept-Des., hal. 19-25.

Van Esterik P. Intra-family food distribution: its relevance for maternal and child nutrition. In: Latham MC (ed). Determinants of young child feeding and their implications for nutritional surveillance. Ithaca, New York, Cornell Nutritional Surveillance Program Working Paper no.31, 1985.

Wheeler EF. Intra-household food and nutrient allocation. Nutr ResReviews 1991; 4: 69-81.

Wheeler EF and Abdullah M. (1988) Food allocation within the family: response to fluctuating food supply and food needs. . In: Coping with Uncertainty in Food Supply. De Garine I. and Harrison GA (eds). Oxford: Clarendon Press, 1988: 437-451.

PART 2

SOCIO-CULTURAL ASPECTS OF NUTRITION

CHAPTER 6

Nutrition during Pregnancy and Lactation

Airin Roshita, Andi Mariyasari Septiari, and Judhiastuty Februhartanty

Objectives

1. To discuss nutritional issues during pregnancy and lactation.
2. To explore socio-cultural aspects related to pregnancy and lactation.
3. To examine how workload affects nutrition during pregnancy and lactation.

6.1. Why are Nutritional Issues during Pregnancy and Lactation Important?

A recent UN agency report has documented that global maternal mortality ratios have remained high in the last decade, from 430 per 100,000 live births in 1990 to 400 per 100,000 live births in 2005, with vast majority of maternal death occurred in developing countries (UNICEF, 2008). The latest UNICEF report (2008) shows that around 85% of pregnancy-related death occurs in Africa and South Asia in 2005.

The fifth Millennium Development Goal is focused on the reducing the 1990 maternal mortality ratio by three quarters by 2015 was (UNICEF, 2008). Enhancing maternal nutrition has been put forth as one of the strategies to achieve the goal (UNICEF, 2008), as numerous studies documented that many pregnant women in developing countries have energy and nutrient intake below the recommended level (Panter-Brick, 1989). As such, inadequate weight gain that results is associated with increased risk of low birth weight and very low birth weight infants (Cox and Phelan, 2008; Abrams et al, 2000). Poor maternal nutrition has been linked to many obstetrical complications which can lead to maternal deaths. Risks to the baby include congenital abnormalities, low birth weight (Siega-Riz et al, 1996) an as well as low nutrient stores in infants and mothers (Nichter and Nichter, 1986). Nutrient deficiencies such as iron deficiency anemia, suffered by half of all pregnant women in developing countries which, increases the risk post partum hemorrhage; maternal iodine deficiency is associated with a higher incidence of stillbirths, miscarriage and congenital abnormalities (UNICEF, 2008). In many countries iron together with folate supplementation is routinely recommended for all pregnant women. However, it is common to find complaints regarding the supplementation, such as stomach discomfort among pregnant women which may reduce the effect of the program. Another issue also related to socio-culture, such as belief consuming the supplement may give negative impact to the fetus. Illness suffered by pregnant and lactating women may also interfere their nutritional status, such as worm infestations.

6.2. Factors Influencing Nutrient Intake during Pregnancy

Numerous studies have suggested that deviations in maternal weight gain can act as predictors of social and biological factors that relate to poor birth outcomes (Abrams et al, 2000). Like wise, social and biological factors may influence the food choices of pregnant women. Fowles and Fowles (2008) argued that besides being influenced by individual factors such as physiological, cognitive and psychological factors, healthy eating during pregnancy is also determined by collective factors which involves interactions between the pregnant woman) and the social environment where she lives. The collective factors include income, marital status, social support, ethnicity, institutional factors, food security, location of food stores, fast food restaurant marketing and public policy (Fowles and Fowles, 2008).

Physiological factors which influence healthy eating include prepregnant Body Mass Index (BMI) and nausea or vomiting. Fowles and Fowles (2008) summarize research which associate high BMI and obesity with poor eating habits and decrease in folate intake. Nausea and vomiting during pregnancy are argued to affect ability to eat and affect the pregnant women choices on food. Nichter and Nichter (1996) in their report on a study conducted in South India found that morning sickness limit the amount of food a pregnant woman will eat and some women perceive morning sickness as hereditary, toxic reaction or caused by an increase in *pitta* (bodily heat). Further, Nichter and Nichter (1996) explain *pitta* as below:

> *Pitta*, an *āyurvedic* term generally translated as bile, is for the layperson a symptom complex associated with dizziness and nausea, yellow excretions from the body, a bitter taste in the mouth, and overheat in the body. Some informants viewed nausea and vomiting as signs that a pregnant woman's desires had not been satiated and postulated a causal relationship between increased desire, heat, and *pitta*. Others linked *pitta* to an increase in bodily heat resulting from the process of pregnancy. According to folk medical tradition (no doubt influenced by *āyurveda*), sour is a taste identified with reducing *pitta* symptoms. For this reason, pregnancy cravings for sour fruits such as unripe mango or lemon were interpreted by some informants as the body seeking to reduce *pitta*.

Cognitive or perceptual factors such as knowledge of nutrition during pregnancy, perception of healthy eating and attitude toward weight gain may also account for healthy eating during pregnancy (Fowles and Fowles, 2008). A study conducted in rural areas of India found that nutrition knowledge among pregnant women was limited to what they consume daily and food selection was based on food habits in the family handed down from one generation to another. This influenced the dietary adequacy and variety of food consumed by the pregnant women (Rao, 1986). The association of nutritional knowledge and adequate diet during pregnancy was also suggested in a qualitative study conducted among poor income women in the US (Fowles et al, 2005). Pregnant women with adequate diets in the study admitted that they eat better during pregnancy and believe that to have a healthy baby they should consume a well-balanced meal.

Perception of healthy eating was very much related with the belief adhered by the women. Nichter and Nichter's study (1986) in India revealed that certain foods were considered unhealthy during pregnancy as they increase body heat. Pregnancy is believed to be a time of increase in body heat similar as the process of fruits ripening,

thus it is time for transformation and development. However, overheating is seen as the cause of miscarriage and delivering premature baby, hence foods considered as heating such as pumpkin *(Curcurbita maxima),* bitter gourd *(Momordica charantia)* and bamboo shoots, and heating grains such as wheat are reduced or avoided and food classified as cooling, for instance tender coconut water, green gram, millet, amaranth and cumin are promoted.

Another common food belief among pregnant women is *pica*, the ingestion of nonfood items. For example in Mexico dirt, clay and magnesium carbonate (Simpson et al, 2000) consumption was found to be as high as 68% in various groups studied. It is predicted to be underreported, because it may be seen as shameful or just "normal" (Simpson et al, 2000). A study in Mexico among pregnant women who practiced *pica* revealed that a mother's reasons for *pica* varied from liking of the taste, smell, texture in the mouth, it was advised by someone, or religious reasons. Some of those women believed that failure to satisfy *pica* would lead to miscarriage, illness or a baby born with mouth open which meant that baby would have unsatisfied needs (Simpson et al, 2000).

Fowles and Fowles (2008) in their review paper have summarized several studies that found associations between attitude toward weight gain and psychological symptoms experienced by pregnant women, and association between pre-pregnant BMI and attitudes toward weight gain. Women with positive attitude toward weight gain had less depressive symptoms compared to those with negative attitude and underweight women were found to have positive attitude about weight gain compared to obese women. In the rural setting, Nichter and Nichter (1986) wrote about how the appropriateness of amount of food consumed is determined according to the body constitution of the women. For instance poor appetite associated with malnutrition was sometimes interpreted as constitutional attributes of a woman and a normal thing in accordance with her body constitution. For instance "one woman with a long-standing riboflavin deficiency manifested as angular stomatitis was compelled by folk health ideology to eat a rather bland, tasteless diet (i.e., without chilies) for several months". Another example they noted was that during pregnancy this woman ate inadequate food and again was seen as "constitutional".

Weight gain is very much related with the amount of food eaten by pregnant women. In rural India, the amount of food consumed was influenced by the belief of how the baby needs space to grow during pregnancy and eating plenty of food will reduce the space needed for baby's development. Besides that, pregnant women avoid eating food believed to be gaseous *(vāyu)* such as sweet potato, jackfruit, bengal gram, and *dhal* which according to them will reduce the living space of the fetus and making some adverse outcomes such as the umbilical cord to get wrapped around the fetus' neck (Nichter and Nichter, 1986). The amount of food eaten is also associated with baby size in this community. Pregnant women prefer to have small baby, as they believe it will ease the delivery and because big babies are not considered as healthy as small, muscular (*puśti)* babies are associated with having vitality and strength. Thus, the women do not want to have "puffy" baby which are seen as have less strength and "bloated" (Nichter and Nichter, 1986).

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Figure 6.1. A typical birthing bed in East Kalimantan, Indonesia following the earth gravitation.

6.3. Factors Influencing Nutrient Intake during Lactation

Lactation is a remarkable process during which the maternal body produces a secretion that provides no immediate benefit to the mother but can totally sustain the offspring. All mammals produce milks with different compositions, each one specific to the needs for growth and development of their offspring. Regardless of a woman's intention to breastfeed, her body prepares for lactation from the first moments of pregnancy. The mammary gland begins its maturational process with the development of the alveolar ductal system and the lacteal cells so that the breast is ready to produce milk upon delivery of the infant. The woman's hormonal balance during pregnancy contributes to the preparation of the breast and promotes accumulation of energy stores, but it suppresses the production of milk until the birth of the infant (IOM, 1991).

The daily nutrient requirements of lactating women are higher than her requirements during pregnancy. Nutrient needs during lactation depend primarily on the volume and composition of milk produced and on the mother's initial nutrient needs and nutritional status. The nutrients needed to produce breast milk can be drawn both from diet and nutrient stores. Low dietary intake combine with low nutrient reserves, may result in nutritional problem for both infant and mother. Thus, adequate maternal nutrition is important during lactation to avoid depletion of maternal nutrient reserves and to promote the optimal nutrition status both mother and child (Mitchell, 2003).

As in pregnancy, the social and biological factors may influence the food choices of lactating women. There are several proscriptions found during lactation in most cultures. Some cultures restrict nutrient rich foods such as fruits, vegetables, meat and fish during lactation due to hot and cold beliefs that they believe to have negative influence on the breast milk. Many cultures recommend of confinements during the first 40 days postpartum, such as in Javanese community which has a lot of food taboos during this period. The reason behind it since they see the postpartum mother and the baby are still in recovery stage and weak, therefore eating certain food like animal food product could delay their recovery. The 40 days period also has biological significance as it takes approximately this long for the uterus to contract to normal size after birth. Therefore, it is seen as vital stage in recovery process for postpartum.

Weight retention is another important concern for postpartum mothers. It is common that most of them desire to go back to their pre-pregnancy weight. Meanwhile, mainly of health practitioners suggest eating in greater frequency and quantity to

increase breast milk production rather than highlight the importance of breastfeeding on demand to sustain it. This information may mislead to the consequence of the importance of breastfeeding on demand. This information may be able to hinder them from performing the right infant feeding (Septiari et al, 2006).

In certain area (mostly in Asia) there are beliefs related to certain vegetables and animal product that might stimulate breast milk production. This tradition has been practiced for generations, and its adherence is still strong. *Torbangun* leaves *(Coleus amboinicus* Lour*)* have been used by Bataknese people in Indonesia for hundreds of years as a lactagogue. Beside it is considered nourishing, usually given to the mother for one month after giving birth in order to restore postpartum mother state of balance and acting as a uterine cleansing agent (Damanik R, 2009). Other examples are cow tail and drumstick fruit's leaves for Myanmarese and *Katuk* leaves in Java as lactogogue.

6.4. Workloads of Pregnant and Lactating Women

Many studies in developing countries have documented little differences in activities between pregnant women and non-pregnant women. A study among Tamang women in rural Nepal shows that pregnant and lactating women perform similar farming activities in the field, especially during spring or monsoon season and even lactating mothers nurse their babies in the field (Panter-Brick, 1989; Panter-Brick, 1993). The farming activities which women have to perform during pregnancy and lactating reflect the constraints on food production at the family level, which needs the continued efforts of family member to provide labor regardless of whether they are pregnant or nursing (Panter-Brick, 1989).

A study among patrilineal (i.e. Karo) and matrilineal (i.e. Minang) families of rural and urban households in Indonesia found a common practice in all groups that a helper was more available during the period after delivery rather than during pregnancy. This suggests that pregnancy was seen as a common phenomena happening to women so they were still expected to do most of the domestic chores. In rural Karo women expressed a feeling of burden due to this workload (Table 6.1). Interestingly, Karo and Minang fathers have also been identified to take important roles in child caring i.e. 21% and 30% respectively, especially among those who live as nuclear families. Due to economic burdens, it is now common for women to work outside home. This leaves the consequence that father's roles in child caring is expected to be more significant and visible (Februhartanty et al, 2005).

A review of the relationship between work during pregnancy and outcomes shows that some working condition such as standing, carrying heavy load, vibration and machine operations have adverse effect on length of gestation and birth weight (Saurel-Cubizolles and Kaminski, 1986). In rural Nepal, the long hours of working mothers have to perform during pregnancy and lactating and inadequate food consumption result in high prevalent of anemia among mothers and a high death rate among under-five children due to deprivation in child care (Panter-Brick, 1989).

Table 6.1 . Resources for care by kinship and setting (%)

	Rural		Jakarta	
	Karo (n=106)	Minang (n=107)	Karo (n=52)	Minang (n=87)
Support for domestic chores				
Helper during pregnancy available	51.4	50.0	51.7	69.2
Helper after delivery available	98.1	86.8	95.4	92.3
Maternal mental health				
Disappointment feeling related to				
Domestic problem	67.9	17.8	23.1	13.8
Problem from outside	7.5	3.7	19.2	5.7
Feeling burdened with the domestic chores	44.3	13.1	23.1	16.1

(**Source:** Februhartanty et al, 2005)

Summary

Pregnancy and lactation are marked by different cultural beliefs and values. These beliefs and values give perspective to the meaning of food choices and taboos adhered to during pregnancy and lactation, since they could jeopardize the nutrition status of pregnant and lactating women. The other issue is gender, as pregnant and lactating women still have to be involved in intensive economic activities and therefore do not have enough time to take care of themselves and their babies.

Case study:

Nutritional Counseling during Pregnancy and Lactation among Immigrant Population in USA

Nutritional issues in pregnancy have gained greater importance in routine prenatal care as obesity issues, low birth weight (LBW) concern, and neural tube defect (NTD) prevention strategies have moved into the forefront of prevention measurement. The pregnancy weight gain goal was set to optimize pregnancy outcome. However, only 30-40% of pregnant women in USA stay within the recommend ranges and immigrant women (i.e. Mexican and El Savador) are considered as the vulnerable one. Therefore, special attention is needed.

Serving an immigrant population provides its own set of challenges, apart from language differences. Health-related behaviors often decline from first to second generation and greater acculturation has been linked to worse birth outcome. With immigration, dietary patterns often change. Physical availability (what food is sold in the market) and cultural availability (what is considered acceptable) may change, and although food preferences and habits are often held tightly as a way to maintain one's culture, the dominant culture will exert a strong influence. In addition, as people have higher incomes, they tend to increase their intake of animal proteins, fats, and sugars and decrease their intake of vegetable proteins and carbohydrates. Positive aspects of a traditional culture need to be actively reinforced, including the tradition of eating homemade food rather than eating out which usually lower in added fats, salt, and sugars. The cultural norm to breastfeed and the high value placed on children and childbearing in traditional culture.

Some traditional practices or beliefs may be harmful and only these should be modified. Immigrant women may feel they cannot breastfeed long term because they have been told their breast milk is not good after 6 months. Some are afraid to breastfeed because they have "coraje" (strong anger) that will make the milk dangerous for the baby. They have heard that low-fat milk is just watered down whole milk and so would not be good during pregnancy. However, one must be careful not to generalize because individuals will not necessary follow the cultural stereotype.

In addition, reported problems may be inconsistent. No complying with a craving may cause something to be missing form the baby (Mexico) or may cause the baby to be born sad; never able to close his/her mouth, and so will always drool (El Salvador). The patients herself may not necessarily believe, but will be given instructions by her family on what to do or what to avoid. These underlying assumptions and fears will affect a patient's ability to understand and act on prescribed suggestions and, as much as possible, teaching needs to fit into patient's cultural framework.

Source: Cox, J. T., & Phelan, S. T, 2008.

Learning Activity 6.1.

Task: What do you know about involvement of pregnant women in economic activities in your country?

Learning Activity 6.2.

Task: Mention some foods which are restricted for pregnant women and lactating women in your cultures, also state the reasons for restriction and their nutrient values

Target	Food avoided	Reasons	Otherwise scarce nutrient in this food
Pregnant			
Lactating			

Learning Activity 6.3.

Task: Discuss some cultural beliefs related with pregnancy and lactating period in your country and how they can be incorporated or used as themes for culturally appropriate nutrition education programs.

References

Abrams B, Altman SL, and Pickett KE. Pregnancy weight gain: still controversial. Am J Clin Nutr 2000; 71(5 Suppl): 1233S-1241S.

Cox JT, and Phelan ST. Nutrition during pregnancy. Obstet Gynecol Clin North Am 2008; 35(3): 369-383, viii.

Damanik R. Torbangun (Coleus amboinicus Lour): A Bataknese traditional cuisine perceived as cactagogue by Bataknese lactating women in Simalungun, North Sumatera, Indonesia. J Hum Lact 2009; 25(1):64-72.

Februhartanty J, Fransisca DO, Roshita A, Fahmida U, Dianawati E. Childcare of children under three years old in patrilineal and matrilineal families: A study among Karo and Minangkabau households. Research Report. Jakarta, Indonesia: SEAMEO-TROPMED RCCN-UI, 2005.

Fowles ER, and Fowles, SL. Healthy eating during pregnancy: determinants and supportive strategies. J Community Health Nurs 2008; 25(3): 138-152.

Fowles ER, Hendricks JA, and Walker LO. Identifying healthy eating strategies in low-income pregnant women: applying a positive deviance model. Health Care Women Int. 2005; 26(9): 807-820.

IOM. Nutrition during lactation. Washington: IOM, 1991.

Mitchell MK. Nutrition across the life span. 2nd eds. Philladelphia: Saunders, 2003.

Nichter M. Anthropology and international health : south Asian case studies. Dordrecht ; Boston: Kluwer Academic Publishers, 1989.

Panter-Brick C. Motherhood and subsistence work: the Tamang of rural Nepal. Human Ecology 1989; 17(2): 205-28.

Rao M. Knowledge, attitude and practice regarding nutrition among pregnant women in rural Dharwad, Karnataka, India. Ecology of food and nutrition 1986; 18: 197-208.

Saurel-Cubizolles MJ, and Kaminski M. Work in pregnancy: its evolving relationship with perinatal outcome (a review). Soc Sci Med 1986; 22(4): 431-442.

Septiari AM, Februhartanty J, and Bardosono S. How can mothers exclusively breastfeed until 6 months? An exploration of support from the health service providers. *To be submitted to Journal of Social Science & Medicine.*

Siega-Riz AM, Adair LS, and Hobel CJ. Maternal underweight status and inadequate rate of weight gain during the third trimester of pregnancy increases the risk of preterm delivery. J Nutr 1996; 126(1): 146-153.

Simpson E, Mull JD, Longley E, and East J. Pica during pregnancy in low-income women born in Mexico. West J Med. 2000; 173(1):20-24; discussion 25.

UNICEF. State of the world children 2009. New York: UNICEF, 2008.

Wheeler EF. Intra-household food and nutrient allocation. Nutr Res Reviews 1991; 4: 69-81.

CHAPTER 7

Breastfeeding and Infant Feeding

Andi Mariyasari Septiari and Judhiastuty Februhartanty

Objectives:

1. To emphasize the significance of breastfeeding.
2. To explore factors influencing breastfeeding practices including the socio-cultural aspects.

7.1. Introduction

"Whenever possible, the mother's milk should be given and by suckling. For that is the aliment of all others most like in substance to the nutrient material which the infant received while in the womb"
(Avicenna, a physician of the eleventh-century)

Breastfeeding, where the child receives breast milk direct from the breast or expressed (Labbok, 2000) is an unequal way of providing ideal food for the healthy growth and development of infants. It has unique biological and emotional influences on the health of both mother and child.

Appropriate breastfeeding practices are fundamentally important for the survival, growth, development, health and nutrition of infants. Appropriate child feeding starts with certain key behavior of breastfeeding i.e. early initiation of breastfeeding, feeding of colostrums to the newborn, exclusive breastfeeding for the first 0-6 months and continued breastfeeding through the second year (WHO, 2003).

Breast milk is the superior food for babies as it provides all the nutrients needed for healthy growth and development for the infants first six months of life. Breast milk fulfills 60-70% and 30% of a baby's nutrient requirement for 6-12 months and > 12 months, respectively. Moreover, it contains nutrients that serve the inimitable needs of the infant, such as certain essential polyunsaturated fatty acids, certain milk proteins, and in a readily absorbable form. Breast milk also has immunological and bioactive substances, absent from commercial infant formulas, which confer protection from bacterial and viral infections and may aid gut adaptation and development of the newborn. The composition of breast milk is not constant but changes during feeds, according to the time of day, and during the course of lactation (Michaelsen, 2000).

In addition to its nutritional benefits, breastfeeding also confers a number of non-nutritional advantages to infants. These include protections against various acute and chronic illnesses, and enhanced physiological and behavioral development.

Health advantages of breastfeeding for infants and mothers

Infant:

- Reduced incidence and duration of diarrhea illnesses
- Protection against respiratory infection
- Reduced occurrence of otitis media and recurrent otitis media
- Possible protection against neonatal necrotizing enterocolitis, bacteraemia, meningitis, botulism, and urinary tract infection
- Possible reduced risk of auto-immune disease, such as diabetes mellitus type I and inflammatory bowel disease
- Possible reduced risk of sudden infant death syndrome
- Reduced risk of developing cow's milk allergy
- Possible reduced risk of adiposity later in childhood
- Improved visual acuity and psychomotor development, which may be caused by polyunsaturated fatty acid in the milk, particularly docosahexaenoic acid
- Higher IQ scores, which may be the result of factors present in milk or to greater stimulation
- Reduced malocclusion due to better jaw shape and development

Mother:

- Early initiation of breastfeeding after birth promotes maternal recovery from childbirth; accelerates uterine involution and reduces the risk of hemorrhaging, thereby reducing maternal mortality; and preserves maternal hemoglobin stores through reduced blood loss, leading to improved iron status
- Prolonged period of postpartum infertility, leading to increased spacing between successive pregnancies if no contraceptive are used
- Possible accelerate weight loss and return to prepregnancy body weight
- Reduced risk of premenopausal breast cancer
- Possible reduced risk of ovarian cancer
- Possible improved bone mineralization and thereby decreased risk of postmenopausal hip fracture

Source: Michaelsen KF, Weaver L, Branca F and Robertson A, 2000.

Besides specific health advantages for infants and mothers, economic, family, and environmental benefits have been described as well. These benefits include the potential for decreased annual health care costs (WHO, 1998; Ball and Wright, 1999), decreased costs for public health programs, decreased parental employee absenteeism and associated loss of family income, more time for attention to siblings and other family matters as a result of decreased infant illness, decreased environmental burden for disposal of formula cans and bottles, and decreased energy demands for production and transport of artificial feeding products (León-Cava et al, 2002). In developed country settings, such as the US, these savings for the country and for families would are offset to some extent by increased costs for physician and lactation consultations, increased

office-visit time, and cost of breast pumps and other equipment, all of which should be covered by insurance payments to providers and families (The American Academy of Pediatrics, 2005).

7.2. Factors Influencing Breastfeeding Practices

Even though breastfeeding is a natural act, it is also a learned behavior that is affected by accurate information and support within families, communities and the health care system (WHO, 2003). Many studies found that simply understanding the benefits of breastfeeding is not convincing enough to encourage nursing mothers to perform breastfeeding practices as recommended. These due to the fact that factors influencing breastfeeding practices are multifaceted (Februhartanty et al, 2007).

According to Bentley et al (2003), the decision making process regarding breastfeeding is influenced by a number of factors as shown in the Social Ecological Framework (Figure 7.1). The model conceptualizes overlapping spheres of influence which allow investigating of macrolevel-microlevel linkages associated with infant feeding.

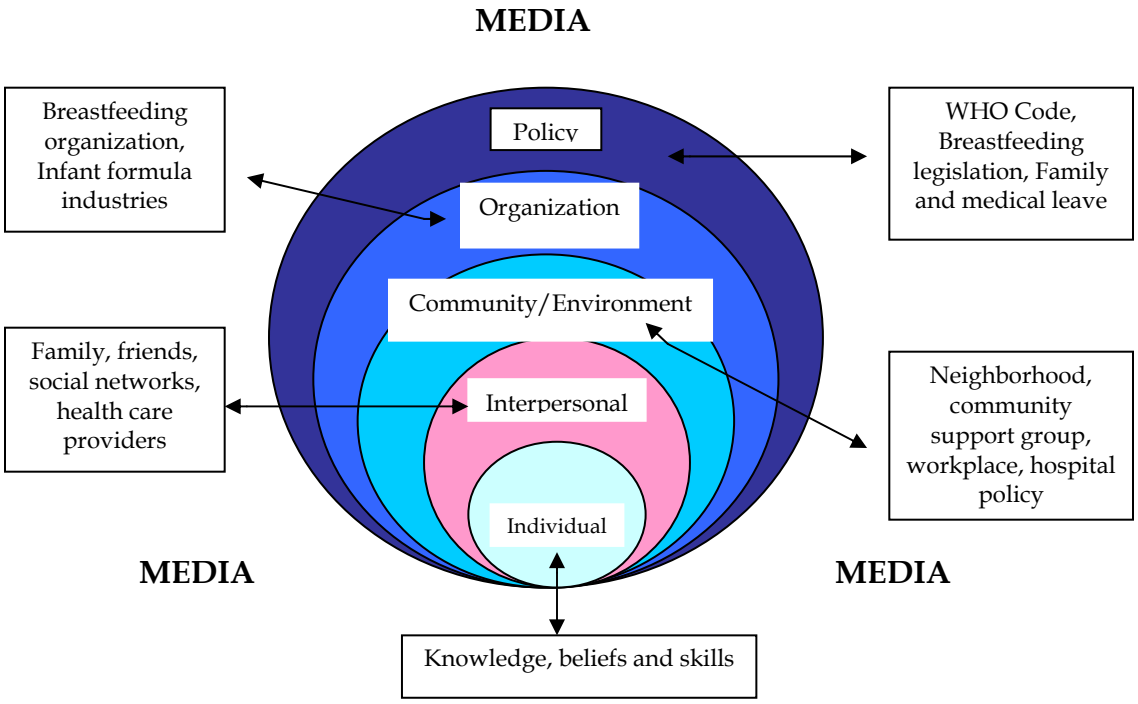

Figure 7.1. Social ecological framework on breastfeeding
(**Source**: Bentley et al, 2003).

The macrolevel factors such as the important role of media is described as pervasive and powerful and has the potential to affect social norm about breastfeeding and decision making. Policy, in this case national legislation can either directly or indirectly influences breastfeeding rates. Political economic factors can lead to health disparity and poverty. The level of the organization, such as marketing by infant

formula companies, including free formula samples provided to women in hospital can also greatly affect breastfeeding patterns (Bentley et al, 2003).

At the microlevel, factors include community and environmental factors that support or discourage breastfeeding, such as the neighborhood culture, availability of community support groups, focus of the health care providers, workplace and hospital policy At the interpersonal level, factors such as social and personal networks and the role of family influence women's choices; and individual level factors, such as knowledge, beliefs and skill will affect feeding decisions (Bentley et al, 2003).

Another conceptual framework by Hector et al. (2005), it highlighted the importance of media in influencing breastfeeding practice. It proposes three levels of factors that influence breastfeeding practices: individual, group and society (Figure 7.2.). The framework can be used to generate hypotheses about factors affecting breastfeeding and the types of interventions that might be used to address them. Individual level factors relate directly to the mother, infant, and the 'mother-infant dyad'. They include the mother's intention to breastfeed, her knowledge, skills and parenting experience, the birth experience, health and risk status of mothers and infants, and the nature of early interaction between mother and infant. Each of these can directly influence the initiation and duration of breastfeeding, and are frequently correlated with social and demographic variables. Group level factors are the attributes of the environments in which mothers and infants find themselves the attributes that enable mothers to breastfeed. Environments with a direct influence on mothers and infants include:

- the hospital and health facilities environment, in which practices and procedures such as infants routinely rooming-in with mothers to allow demand feeding, postpartum skin-to-skin contact and providing professional support with breastfeeding technique difficulties influence the early feeding experience and the follow-up care and support
- the home and peer environment, where physical and social factors such as size of household, parity, family circumstances, partner attitudes and support, and peer support affect the time, energy and resolve that mothers have for breastfeeding
- the work environment, in which policies, practices and facilities such as work hours and flexibility, facilities and policies that enable on-site expressing and storing of breast milk influence mother's ability to combine work and breastfeeding
- the community environment, which signals the extent to which breastfeeding is recognized as a norm, and reinforced by facilities and policies in public places, for example parenting rooms in shopping centers and entertainment venues, 'breastfeeding friendly' public transport, restaurants
- the public policy environment, which modifies how each of these environments influence mother's feeding decisions. For example, benefits such as maternity and paternity leave, childcare allowances and health insurance have a significant impact on the hospital, home, and work environments that in turn, influence infant feeding decisions directly.

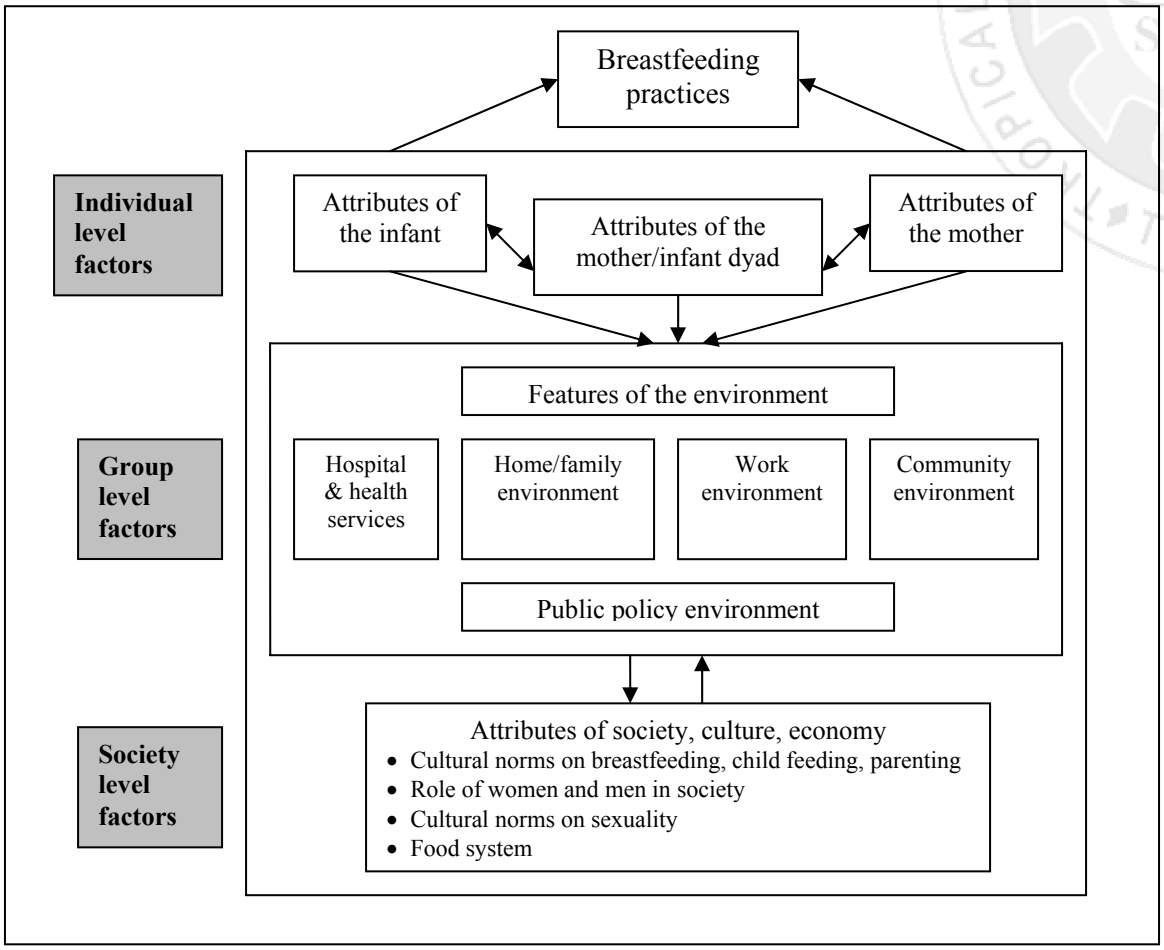

Figure 7.2. A conceptual framework of factors affecting breastfeeding practices
(**Source**: Hector et al, 2005)

Societal level factors influence the acceptability and expectations about breastfeeding and provide the background or the context in which mothers' feeding practices occur. These include cultural norms regarding breastfeeding, child feeding, and parenting; the role of women in society, including how working outside the home is valued; the extent to which men's social role includes support for breastfeeding mothers; the extent to which exposing breasts for feeding is complicated by cultural norms regarding sexuality; and the economic importance of products such as breast milk substitutes and complementary foods in the food system. Group level and societal level influences may interact in either positive or negative ways with maternal knowledge and skills. For example, a mother may be predisposed to breastfeed, but a non-supportive environment in the hospital may lead to her deciding to stop breastfeeding early. Similarly, even if breastfeeding is still occurring at hospital-discharge, a lack of support at home or in the community may also lead to her stopping early. Again, broader societal attitudes about sexuality, and especially breasts, can influence the manner and degree of community support (Hector et al, 2005).

Table 7.1. Practices that help and hinder breastfeeding

Practices that can hinder breastfeeding	Practices that can help breastfeeding
Separation of mother and baby	Skin-to-skin contact between mother and baby
Delaying the first feed	Breastfeeding soon after birth (within 1 hour)
Restricting the frequency of feeding	Frequent, on demand (baby-led) feeding
Feeding to a strict timetable	Letting the baby come off the breast spontaneously
Saying anything that makes a mother doubt her ability to produce milk	Building mother's confidence through kindness and encouragement
Isolating the mother from those who support breastfeeding	Refer mother to breastfeeding support group
Using nipple shields, bottle teats, and pacifiers	Using cup or spoon feeding
	Avoiding nipple shield, bottle teats, and pacifiers
Washing the nipples before or after every breastfeed	Avoiding creams and ointments on the nipples; avoiding soap on the breasts and washing them too often before breastfeeding
Taking the baby off the breast before the baby is finished	Good positioning and attachment of the baby at the breast
Giving other fluids before the first breastfeed	Exclusive breastfeeding
Giving supplementary feeds of artificial milk	
Giving plain water, dextrose, glucose or sucrose water or teas between feeds	
Using drugs during childbirth that sedate the baby	

(Source: Michaelsen, 2000).

Apart from the above factors, culture and beliefs have found to play role in breastfeeding practices. For example, in Aceh and most parts of Indonesia, nursing mothers believe that they should provide both breasts for each feeding since right breast is believed to contain the food and the left contains the water for drinking. This belief has been transferred from generation to generation, and is now the current norm especially in rural settings (UNICEF NAD West Coast, 2008). From a biological perspective, this practice may contribute to the failure of breastfeeding because breast emptying may be interrupted? Thus breast milk production is hindered. From a nutritional nutrition perspective, the child may not be sufficiently fed because he/she does not get enough hindmilk (breast milk with higher fat content) because of "unfinished" feedings (Lawrence and Lawrence, 2005).

Maternal employment outside the home (Wijekoon et al, 1995; Green, 1999; Dearden et al, 2002; El-Gilany, 2003; Kelly and Watt, 2005; Ong et al, 2005; Septiari et al, 2006) is also considered major influence hindering exclusive breastfeeding practice. Interestingly, a cohort study in UK found that breastfeeding was less initiated and exclusive breastfeeding was less practiced by women with routine job compared to their counterparts in higher managerial and professional occupations (Kelly and Watt, 2005). This suggests that women in lower income group were more vulnerable. A study in

rural Vietnam found that exclusively breastfeeding mothers who worked differed from other mothers in important ways e.g. all felt they had enough milk, all knew the appropriate time to introduce liquids and foods, and most were supported in their breastfeeding decisions by commune health workers and family members. The proportion of exclusive breastfeeding practice among women who had returned to work postpartum and who had not yet returned to work were 3% and 21% respectively (Dearden et al, 2002).

(m)

On the left: UNICEF photograph of thriving breastfed twin and his dying bottle-fed sister (Courtesy of Children's Hospital, Islamabad, Pakistan)

"*Breastfeeding is the most precious gift a mother can give to her infant.*
If there is illness of infection, it may be a life saving gift.
If there is poverty, it may be the only gift."

Ruth A. Lawrence, MD, FABM

Figure 7.3. The interplay of culture, gender, and poverty in infant feeding.

7.3. Infant Feeding Decision: Breastfeeding and the Advent of Bottle Feeding

Near the end of eighteen century the conical glass infant feeding bottle was developed, fitted with a "tubular mouthpiece enclosed in an overlapping finger linen, parchment or wash-leather". This new low-cost device replaced earlier feeding devices such as perforated cow horns and various forms of pap spoons. Thus, concurrent with the beginning of the Industrial Revolution, technological developments for the first time made possible a widespread shift away from breastfeeding of human infants. Before the advent of this technological breakthrough, those women who wished to avoid some of these responsibilities of breastfeeding had resorted to use of wet nurses-a practice that is of considerable antiquity in the western world (Pelto, 1981).

To explain the changing infant feeding practices, Pelto (1981) has identified three orientations affecting these changes; these include:

- Women's right/feminist orientation,
- The contemporary social philosophy associated with the women's rights movement has been arguing both for and against bottle feeding. In this orientation, women are supposed to be intelligent, independent and able to make rational choices.
- On the one hand, artificial feeding can be regarded as a boon to women, giving them the opportunity to engage freely in other activities without being tied to a schedule of infant feeding. Therefore, the trend toward bottle feeding can be

interpreted as a reflection of women' increasing expression of their right to control their own time and activities.

- On the other hand, members of the women' movement have argued strongly for a woman's rights to fulfill her biological function as a nurturer of her infants without penalty (e.g. loss of job, pay) and without interference or coercion. From this perspective, the increase in bottle feeding can be regarded in a negative light, a reflection of increased male dominance over women, caused, in part, by the increasing dominance of male physicians over female reproductive activities.
- Anti-commercial orientation,
- Anti-commercial orientation portrays women as gullible victims of promotions from infant formula industries.
- Biological determinist position,
- Biological determinism focuses o concepts of women' natural biological qualities in relation to child care. From this perspective, any deviations from long-established patterns of infant feeding are generally thought as "deviance" or "warping" of women's personalities and essential nature. This orientation is subtly at work in the new advertising gambit of the formula manufacturers; reflect in such phrases as, "When mother's milk fails" or "The best substitute when mothers can't nurse." The implication is that women' biological capacity is weak, requiring the benign assistance of industrial progress. And based on biological determinist orientation, trend toward bottle feeding is seen as "biological failure".

In contrast to the preceding orientations, there are a number of approaches to explain infant feeding trends which are either directly theoretical or imply a theory in the selection of variables for empirical study. These approaches can be characterized as modernization model, economic model, and bio-cultural model Pelto (1981).

- Modernization model
- Modernization is being frequently used to explain trends in infant feeding. Aspects in modernization which lead to the trends are urbanization, modernization, new social values, influence of mass media, improvements in transportation and communication and exposure to ideas of health personnel. Those factors may lead shifting of traditional values.
- Economic model
- It emphasis on how women' economic activities and income effect their infant' feeding patterns. As stated in modernization model, this model also include the issues on the economic motivations of the commercial interests that stand to gain from a large scale shift to bottle feeding, i.e. the infant food manufacturers, the advertising media and limited extent, health professionals.
- Bio-cultural model
- Bio-cultural model explains the different of "lactation failure" and "premature weaning"

WHO definitions of breastfeeding

Exclusive breastfeeding: the infant takes only breast milk and no additional food, water, or other fluids with the exception of medicines and vitamin or mineral drops.
Partial breastfeeding or mixed feeding: the infant is given some breast feeds and some artificial feeds, either milk or cereal, or other food or water.
Bottle-feeding: the infant is feeding from a bottle, regardless of its contents, including expressed breast milk.
Replacement feeding: the process of feeding a child of an HIV-positive mother who is not receiving any breast milk with a diet that provides all the nutrients the child needs.

7.4. Infant Feeding in HIV/AIDS and Emergency Situations

There are currently around 33.2 million people living with HIV/AIDS worldwide (WHO, 2008) Of these, nearly half are women of reproductive age. As a result, a large number of infants are born having contracted the disease from their mother. Mother-to-child transmission (MTCT) of HIV accounts for about 800,000 or 10% of all new HIV infections worldwide each year. Pediatric HIV infection causes premature death when antiretroviral (ARV) treatment is not available. In Africa, for example, 30 to 50% of all untreated HIV-positive children die before their first birthday and fewer than 30% survive beyond 5 years of age (Dray-Spira et al, 2000).

Mother-to-child transmission (MTCT) of HIV accounts for the vast majority of children who are infected with HIV. In the last two decades, before the large roll out of prevention of mother to child transmission (PMTCT) programs, approximately 30%-40% of HIV infected women transmitted the virus to their newborn babies. These children have contracted the virus through vertical transmission, either in the womb during pregnancy, during the period of delivery or from being exposed to the virus over the period of breastfeeding. Many of them will suffer from malnutrition at some point in their lives, either as a direct physiological consequence of the virus, or from socio-economic effects from the impact of the virus at household level. In the absence of interventions to prevent transmission, 5 to 10% of infants born to HIV-infected mothers are infected in-utero, 10 to 15% are infected during childbirth, and another 5 to 20% are infected through breastfeeding (De Cock et al, 2000).

Several conditions are known to increase the risk of HIV transmission during breastfeeding. These include the mother's immune status (Leroy et al, 2003; John et al, 2001) and blood viral load (Richardson et al, 2003; Semba et al, 1999); the duration of breastfeeding (Read et al, 2002); the presence of bleeding nipples (Embree et al, 2000; John et al, 2001), breast inflammation, mastitis, abscesses (Embree et al, 2000; John et al, 2001; Semba et al, 2001; Ekpini et al, 1997) or oral thrush in infants (Embree et al, 2000). Mixed feeding may also increase the risk of HIV transmission (Coutsoudis et al, 1999; 2001). Women who become infected with HIV while they are breastfeeding are also more likely to infect their infants during breastfeeding because of the higher viral load that occurs at this time (Dunn et al, 1992).

WHO HIV and Infant Feeding Technical Consultation Consensus Statement in 2006 stated that *"When replacement feeding (RF) is Acceptable, Feasible, Affordable,*

Sustainable and Safe (AFASS), avoidance of all breastfeeding by HIV-infected mothers is recommended. Otherwise, exclusive breastfeeding is recommended during the first months of life".

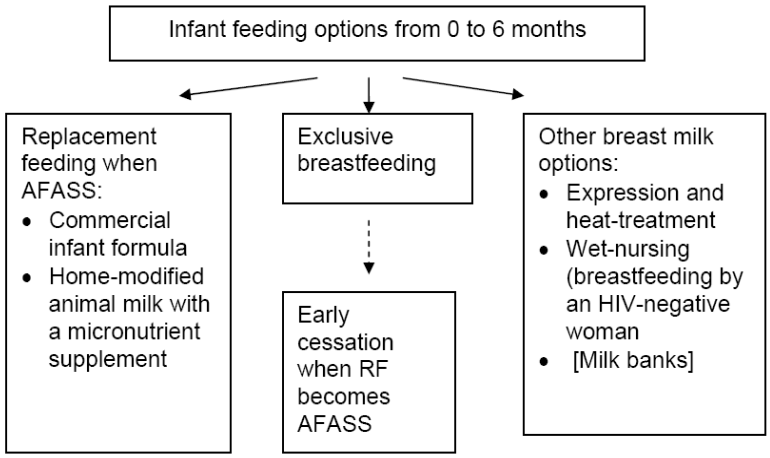

Figure 7.4. Infant feeding options from 0-6 months for HIV positive mothers

In addition, joint UN agencies recommend breastfeeding as a vital response during emergency because the availability of clean and safe water as well as fuel is dominantly affected in this situation. It is reported that higher incidence of diarrhea among bottle-fed children compared to their breastfed counterpart exist due to the lack of safe water crucially needed for preparing the bottle feeding. Nevertheless, much work is still needed to educate a wider community to protect and support breastfeeding during emergency.

Summary

Breastfeeding is a health behavior that greatly reduces infant morbidity and mortality, especially in resource poor settings. Its advantages to mothers and infants have been widely documented. Although breastfeeding is considered as a natural act and is a cultural norm in almost all societies, it is a learning behavior, and thus it is influenced by a complex of factors. With the advent of HIV/AIDS and increasing events such as natural disasters, efforts should be focused on understanding what actions are needed to protect and support breastfeeding practice.

Case study:

(n)

Gender issues in breastfeeding: A case study from Jakarta, Indonesia

In a country like Indonesia, breastfeeding in general remains a normative act both in rural and urban areas. However, exclusive breastfeeding practice is much less common in this society.

As studied in both developed and developing countries, this failure is found to be due to multifaceted factors. The nursing mother's social networks (such as the hospital/health service, home/family, community and neighborhood as well as workplace environments, also the media) have been found to play roles aside from her internal motivation. The father as part of the home/family environment has been identified as one of the important influences on successful breastfeeding. Fathers were found to be influential in breastfeeding initiation, duration of breastfeeding, but unfortunately also in the introduction of bottle feeding.

In most parts of the world and also in Jakarta, the capital city of Indonesia, child care, and certainly breastfeeding, has long been regarded as a women's issue. Fathers, with the many work-related demands on them, have been thought to be lacking in their parenting function.

A study in Jakarta found that there some roles of the fathers which do influence breastfeeding. These roles include their role in seeking information about breastfeeding and infant feeding (role 1), their participation in decision making of current feeding mode (role 2), in selection of place for ANC, delivery, and PNC (role 3), degree of involvement during ANC visits (role 4), having positive attitude towards their marriage (role 5), and involvement in a number of child care activities (role 6). Type of role 3 was the most common whilst role 2 was the least practiced. Father's involvement in seeking information about breastfeeding was the most influential to timely breastfeeding practice. Whilst father's involvement in decision making of the current infant feeding mode and his positive attitude toward the marital relationship were found to be influential to exclusive breastfeeding practice.

The data show that some of the roles the fathers played are irrelevant to breastfeeding. It is unfortunate that the roles which are significantly associated with breastfeeding are not optimally practiced by the fathers. This suggests that there has been a gap between what is perceived by the fathers as being supportive to the mothers and what the nursing mothers' expectation is on what kind of supports needed from the fathers.

Interestingly, participation of the father in the examination room during antenatal care (ANC) visits negatively influenced breastfeeding. Although it needs further investigation, one possible hypothesis may be that these fathers were passive (due to lack of knowledge), and so the health personnel who may also lack of skill on lactation management dominated the ANC session. This is probably worsened by the fact that the health personnel's point of view is often perceived as "the best" by this type of father.

Furthermore, the findings from this study lead to a convergence outlook that the father's knowledge is a predisposing factor influencing his support of breastfeeding practices, irrespective of his work demand as the breadwinner. Nevertheless, an overall impression towards gender issues in breastfeeding as found in this study reflects the existence of gender discrimination. Who is the victim? The answer to this question is both the mother and the father. Why? In order for the father to play a role in improving breastfeeding practice as expected, the father should be equipped with knowledge relevant not only to breastfeeding but also to parenting issues. Where could the father get such resources for him to provide appropriate support for the mother? In this study, most fathers waited outside the

examination room during ANC, delivery, and PNC visits. Some admitted that they were forbidden to be inside the room by the health personnel. Some mentioned that they found it difficult to work with the health personnel. There is seemingly nobody to turn to when it comes to fatherhood preparation. Fathers just have to be ready, and learn by doing. These facts clearly show how the father is discriminated against in matters of maternal and child health. Unfortunately, with all of these obstacles, fathers have become solely focused on their role in the so-called "male domain" such as income earning activities, and thus leaving the nursing mother with no one to share her load as a parent.

Source: Februhartanty J, 2008.

Learning Activity 7.1.

Task: Designing an intervention program to address:

- Low exclusive breastfeeding rates in Indonesia
- Desire for formula milk

Explained:

- What activities will be done
- Who will be targeted
- For how long

Learning Activity 7.2. The standard of **AFASS** in infant feeding practice for HIV nursing mothers is a global recommendation.

Task: Explain your point of view regarding the applicability of the AFASS standard in your country or place of origin.

References:

Ball TM, Wright AL. Health care cost of formula-feeding in the first year of life. Pediatrics 1999; 103: 870–876. Accessed from http://www.pediatrics.org/cgi/content/full/103/4/S1/870 on 1 September 2009.

Februhartanty J, Bardosono S, and Septiari AM. Support for exclusive breastfeeding practice: Do fathers in Jakarta provide this support? Majalah Kesehatan Perkotaan 2007; 14 (1): 25-33.

Februhartanty J. Strategic roles of fathers in optimizing breastfeeding practices: A study in an urban setting of Jakarta. Dissertation. Faculty of Medicine, University of Indonesia. 2008.

Coutsoudis A, Pillay K, Kuhn L et al. Method of feeding and transmission of HIV-1 from mothers to children by 15 months of age: prospective cohort study from Durban, South Africa. AIDS 2001; 15: 379–387.

Coutsoudis A, Pillay K, Spooner E et al. Influence of infant-feeding patterns on early mother-to-child transmission of HIV-1 in Durban, South Africa: a prospective cohort study. South African Vitamin A Study Group. Lancet 1999; 354: 471–476.

De Cock KM, Fowler MG, Mercier E et al. Prevention of mother-to-child HIV transmission in resource-poor countries: translating research into policy and practice. JAMA 2000; 283: 1175–1182.

Dray-Spira R, Lepage P, Dabis F. Prevention of infectious complications of paediatric HIV infection in Africa. *AIDS* 2000; 14: 1091–1099.

Dunn DT, Newell ML, Ades AE, Peckham CS. Risk of human immunodeficiency virus type 1 transmission through breastfeeding. Lancet 1992; 340: 585–588.

Embree JE, Njenga S, Datta P et al. Risk factors for postnatal mother-child transmission of HIV-1. AIDS 2000; 14: 2535–2541.

Ekpini ER, Wiktor SZ, Satten GA et al. Late postnatal mother-to-child transmission of HIV-1 in Abidjan, Cote d'Ivoire. Lancet 1997;349: 1054–1059.

Hector D, King L, Webb K. Factors affecting breastfeeding practices: Applying a conceptual framework. NSW Public Health Bull 2005; 16(3-4): 52-55.

John GC, Nduati RW, Mbori-Ngacha DA et al. Correlates of mother-to-child human immunodeficiency virus type 1 (HIV-1) transmission: association with maternal plasma HIV-1 RNA load, genital HIV-1 DNA shedding, and breast infections. J Infect Dis 2001; 183: 206–212.

Labbok M. What is the definition of breastfeeding? Breastfeeding Abstract February 2000; 19(3):19-21. Available at www.lalecheleague.org/ba/Feb00.html. Accessed on 1 September 2009.

Lawrence RA, Lawrence RM. Breastfeeding: A guide for medical profession. 6th edition. Philadelphia, USA: Mosby Inc., 2005.

León-Cava N, Lutter C, Ross J, and Martin L. Quantifying the Benefits of Breastfeeding: A Summary of the Evidence. Washington DC, USA: Food and Nutrition Program/Health Promotion and Protection Division, Pan American Health Organization (PAHO), 2002.

Leroy V, Karon JM, Alioum A et al. Postnatal transmission of HIV-1 after a maternal short-course zidovudine peripartum regimen in West Africa. AIDS 2003; 17: 1493–1501.

Michaelsen KF, Weaver L, Branca F and Robertson A. Feeding and nutrition of infants and young children: Guidelines for the WHO European Region, with emphasis on the former Soviet countries. Denmark: WHO, 2000.

Pelto GH. Perspectives on infant feeding: decision-making and ecology. Food and Nut Bull 1981; 3(3): 16-29.

Read JS, Newell ML, Dabis F, Leroy V. Breastfeeding and late postnatal transmission of HIV-1: An individual patient data meta-analysis (Breastfeeding and HIV International Transmission Study). XIV International AIDS Conference, Barcelona, Spain. Abstract TuOrB1177, July 2002.

Richardson BA, John-Stewart G, Hughes JP et al. Breast milk infectivity in human immunodeficiency virus type 1 mothers. J Infect Dis. 2003; 187: 736–740.

Semba RD, Kumwenda N, Hoover DR et al. Human immunodeficiency virus load in breast milk, mastitis,and mother-to-child transmission of human immunodeficiency virus type 1. J Infect Dis. 1999; 180: 93–98.

The American Academy of Pediatrics. Policy statement: Breastfeeding and the use of human milk. Pediatrics 2005; 115 (2): 496-506. Accessed from http://pediatrics.aappublications.org/cgi/content/full/115/2/496 on 1 September 2009.

UNICEF NAD West Coast. Monitoring and evaluation breastfeeding counseling: The WHO/UNICEF 40-hour training course for health workers in Kabupaten Aceh Jaya and Aceh Barat. Consultancy Report. Aceh: UNICEF NAD West Coast, 2008.

WHO. Evidence for the Ten Steps to Successful Breastfeeding. Geneva, Switzerland: Family and reproductive health, Division of child health and development, WHO, 1998.

WHO. Global strategy for infant and young child feeding. Geneva: WHO. 2003

WHO. HIV transmission through breastfeeding: a review of available evidence: 2007 update. Geneva: WHO. 2008

CHAPTER 8

Complementary Feeding

Andi Mariyasari Septiari and Umi Fahmida

Objectives:

1. To understand the importance of complementary feeding for infant and young children.
2. To emphasize the influence of feeding practice on infant and young children's nutritional status.
3. To explain the socio-cultural aspects affecting complementary feeding practice.

8.1. Introduction

Complementary feeding is defined as the process of giving an infant food in addition to breast milk or infant formula, when either becomes insufficient to satisfy the infant's nutritional requirements. The process of reducing a child's reliance on breastmilk through the provision of complementary foods has been referred to as weaning, but is more accurately now named 'timely complementary feeding'. The timely complementary feeding rate is a composite of two elements:

- continued breastfeeding and
- feeding of solid or semi-solid foods.

Adequate nutrition during infancy and early childhood is fundamental to the development of every child's full human potential. Malnutrition remains as an alarming problem in many developing countries. It is estimated that it is responsible, directly and indirectly, for 60% of the 10.9 million deaths annually among children under five. Over two-thirds of these deaths occur during the first year of life are often associated with inappropriate feeding practices, such as too early or too late introduction of complementary feeding, and foods are often nutritionally inadequate and unsafe. Rising incidences of overweight and obesity in children are also a matter of serious concern. Poor feeding practices are major threat to social and economic development and are among the most serious obstacles to attaining and maintaining health that face this age group (UNICEF, 2000 and WHO, 2003).

As stated in the Convention on the Rights of the Child, children have the right to adequate nutrition and access to safe and nutritious food. Those are essential for fulfilling their right to the highest attainable standard of health. However, rapid social and economic changes may hinder properly feeding and caring for children. Expanding urbanization, for example, results in more families that depend on informal or intermittent employment with uncertain income. Meanwhile, traditional family and community support structures are being eroded, resources devoted to supporting health

and nutrition services are dwindling, accurate information on optimal feeding practice is lacking, and number of food-insecure rural and urban household is on the rise (WHO, 2003). All of these challenges affect appropriate complementary feeding practice for young children and need to be addressed.

8.2. Complementary Feeding

Complementary feeding can be subdivided into two types of foods:

- Transitional foods, which are complementary foods specifically designed to meet the particular nutritional or physiological needs of the infants.
- Family foods, which are complementary foods given to the young child that are broadly the same as those consumed by the rest of the family.

(Michaelsen, 2000 and WH O, 2001).

According to their age, infants do not have the physiological maturity to progress from exclusive breastfeeding directly to family foods. Therefore, transitional foods are necessary to bridge the gap. During the period of transition from exclusive breastfeeding to cessation of breastfeeding, infants gradually become accustomed to eating family foods until they entirely replace breast milk (Fig 8.1.). Children are physically capable of consuming family foods by 1 year of age, after which they no longer need to be modified to meet the special needs of the infant (Michaelsen, 2000).

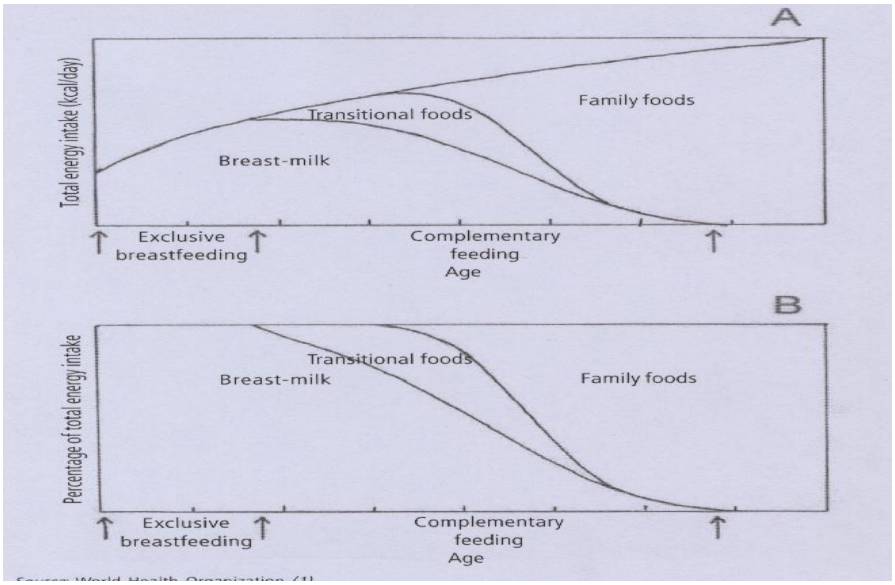

Figure 8.1. Contribution of different food sources to young children's energy intake in relation to age
(**Source**: Michaelsen, 2000)

Infants are particularly vulnerable during the transition period when complementary feeding begins. Ensuring that their nutritional needs are met thus requires that complementary foods be:

- timely – meaning that they are introduced when the need for energy and nutrients exceeds what can be provided through exclusive and frequent breast feeding.
- adequate – meaning that they provide sufficient energy, protein and micronutrients to meet a growing child's nutritional needs.
- safe – meaning that they are hygienically stored and prepared, and fed with clean hands using clean utensils and not bottles and teats.
- properly fed – meaning that they are given consistent with a child's signals of appetite and satiety, and that meal frequency and feeding method – actively encouraging the child, even during illness, to consume sufficient food using finger, spoon or self-feeding are suitable for age.

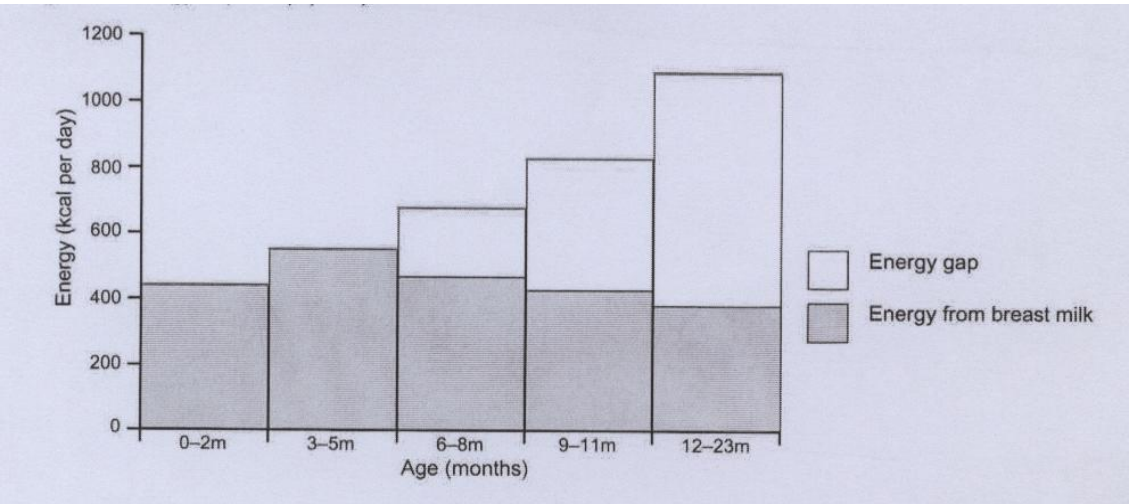

Figure 8.2. Energy required (top line) and the amount from breast milk
(**Source**: WHO, 2000)

Table 8.1. Infant feeding guidance principles

Guiding principle #1: Duration of exclusive breastfeeding and age of introduction of complementary foods	Practice exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age (180 days) while continuing to breastfeed.
Guiding principle #2: Maintenance of breastfeeding	Continue frequent, on-demand breastfeeding until 2 years of age or beyond
Guiding principle #3: Responsive feeding Practice responsive feeding, applying the principles of psycho-social care.	Specifically: a) feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues; b) feed slowly and patiently, and encourage children to eat, but do not force them; c) if children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement; d) minimize distractions during meals if the child loses interest easily; e) remember that feeding times are periods of learning and love - talk to children during feeding, with eye to eye contact.
Guiding principle #4: Safe preparation and storage of complementary foods	Practice good hygiene and proper food handling by a) washing caregivers' and children's hands before food preparation and eating, b) storing foods safely and serving foods immediately after preparation, c) using clean utensils to prepare and serve food, d) using clean cups and bowls when feeding children, and e) avoiding the use of feeding bottles, which are difficult to keep clean.
Guiding principle #5: Amount of complementary food needed	Start at six months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding.
Guiding principle #6: Food consistency	Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities. By 12 months, most children can eat the same types of foods as consumed by the rest of the family.
Guiding principle #7: Meal frequency and energy density	Increase the number of times that the child is fed complementary foods as he/she gets older. The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding.
Guiding principle #8: Nutrient content of complementary foods	Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible.
Guiding principle #9: Use of vitamin-mineral supplements or fortified products for infant and mother	Use fortified complementary foods or vitamin-mineral supplements for the infant, as needed. In some populations, breastfeeding mothers may also need vitamin-mineral supplements or fortified products, both for their own health and to ensure normal concentrations of certain nutrients (particularly vitamins) in their breast milk. [Such products may also be beneficial for prepregnant and pregnant women].
Guiding principle #10: Feeding during and after illness	Increase fluid intake during illness, including more frequent breastfeeding, and encourage the child to eat soft, varied, appetizing, favorite foods. After illness, give food more often than usual and encourage the child to eat more.

(**Source:** WHO, 2003)

a. Timely introduction of complementary foods

In certain places, such as in rural and urban area in Indonesia, complementary foods are often introduced too early because it is thought that this will stop the infants crying too much, thus allowing the mother or caregiver to get on with her work.

There are optimal ages at which to introduce transitional food which is determined by the comparing advantage and disadvantages to the child at a certain age. The adequacy of breast milk to provide sufficient energy and nutrients to maintain growth and prevent deficiencies should be assessed, together with the risk of morbidity. Other important considerations include physiological development and maturity including various developmental cues that indicate an infant's eating readiness. Maternal factors, e.g. her nutritional status and her ability to care for the child should be considered (Michaelsen, 2000).

Given that the potential health benefits of waiting until six months to introduce other foods outweigh any potential risks, WHO (2001) recommends the target age range for complementary feeding is 6 to 24 months of age.

The age during which transitional foods are introduced is important for infant development. The diet undergoes its most radical change, from a single food (breast milk) with fat as the major energy source to one in which an increasing variety of foods are required to meet nutritional needs. This transition is associated not only with increasing and changing nutrient requirements, but also with rapid growth, physiological maturation and development of the infant. Complementary foods also play an important part in the development of neuromuscular coordination. The introductions of transitional foods also exposes the infants to a variety of textures and consistencies, thus encouraging the development of vital motor abilities such as chewing, and also promote the development of eating skills (Michaelsen, 2000).

b. Type, amount and frequency of complementary food

In general, the type of complementary food can be classified as follow:

- common staple food (staple foods).
- culturally food given to a child.
- based on food characteristics (hot and cold foods).

In primarily resource poor areas, affordability and local availability usually determine whether a complementary food is given. A study examined the first complementary food chosen by mothers in urban and rural area (Ebrahim, 2005):

- Urban mothers tend to consider price, characteristics of food, nutrient content, thus choosing manufactured product which is easier for them to prepare and dense in nutrients.
- Rural mothers tend to use home made food, using the common staple food available, cooked in a manner transferred from generation to generation.

Infants have small gastric capacity; about 30ml/kg body weight and require an energy intake of at least 0.8kcal/g; therefore complementary foods should be nutrient dense (WHO, 2001 and WHO 2005). Small amounts of complementary food initially offered should be gradually increased with age and be based on the principles of

responsive feeding (see table above). WHO (2003) recommends two to three meals a day with complementary foods for breastfed infants between 6 and 8 months of life and three to four meals a day for those between 9 and 24 months, with additional snacks once or twice.

8.3. Feeding Practices

For complementary feeding to be successful, not only foods containing all necessary nutrients must be available, and appropriate feeding behavior is essential to ensure optimum development of the child. The dimension of feeding practices is anchored in a wider belief system that influences what, when, where, and how people feed their children (Pelto et al, 2003). Feeding young child requires active care and stimulation, the caregiver is responsive to the child clues for hunger and also encourages the child to eat. (Michaelsen, 2000).

Caregivers are constrained in their ability to provide the best care by a number of factors. According to Michaelsen (2000), these can be divided into three main areas. First, education, knowledge and beliefs represent the capacity of the caregiver to provide appropriate care. Second, factors such as workload and time constraints, nutritional status, physical and mental health, stress and confidence all affect the caregiver's ability to turn his or her capacities into behavior and to implement them. Third, there are factors such as economic resources, including the caregiver's control of those resources, and social support that facilitate this implementation.

Practice Responsive Feeding:
Applying the Principles of Psychosocial Care

(o)

- Feed infants directly and assist older children when they feed them selves, being sensitive to their hunger and satiety cues
- Feed slowly and patiently, and encourage children to eat, but not force them
- If children refuse many foods, experiment with different food combinations, taste, textures and methods of encouragement
- Minimize distraction during meals if the child loses interest easily
- Remember that feeding times are periods of learning and love – talk to children during feeding, with eye to eye contact.

Source: Pelto et al, 2003

8.4. Culture, Customs, Beliefs and Food Taboos

The spectrum of control with regard to infant and young child feeding varies by culture. At one extreme, the caregiver has all of the control, whereas at the other extreme control is given entirely to the child. Neither extreme is good for children are generally not seen often. Too much control in the hands of the caregiver can result in force-feeding, or continued and even intrusive pressure on children to eat. Rather than providing an opportunity for interaction and cognitive and social enhancement, feeding can become a time of conflict resulting in the child refusing food. A responsive caregiver who can adapt to a child's refusals with gentle encouragement often improve food intake. At the other end of spectrum, caregivers are passive and leave the initiative to eat to the child. At certain age, children need and want autonomy in eating; however, too much autonomy will result in their not eating enough. Passive feeding may be due to lack of time and energy, or to a belief that children should not be pressured to eat (Michaelsen, 2000).

During child's illness, either because of culture, customs, beliefs or taboos, in some part of the world, mainly in developing countries, the child is put on a light watery diet consisting of tea or thin-watery gruels which may exacerbate her/his condition. In some circumstances, because if the abruptness of the introduction of complementary feeding, and the false idea that mothers should stop breastfeeding when introducing these foods, may take the children into unsupportive circumstance for meeting their demands' of growth.

In some societies, like in Javanese, in order to make the child give up the breast, to introduce complementary foods, all kinds of bitter applications are applied to the nipple. In many communities it is the custom to send the child away to the grandparents to separate her/him for her/his mother's breast. The mental confusion and psychological trauma produced by these practice are enough to take away the child's appetite. The other reasons to begin giving complementary food are another pregnancy, perceived breast-milk insufficiency; certain developmental milestones achieved by the child such us eruption of teeth.

Therefore, the time of the introduction of complementary foods is fraught with danger for a large proportion of the world's children, and nutritional disorders are common at this time of life. In poor regions of the world, parents are generally unaware of the dietary needs of children, and several customs associated with weaning are likely to give rise to nutritional deficiencies. For examples are "Bhat-Dhara" in Bangladesh and "Anna Prasanna" in India. "Anna Prasanna" must be carried out at the time of weaning. In this ceremony, several kinds of foods are cooked and offered to the deity to invoke her blessing. Often weaning is delayed until such time as the family has been able to save for the expense of the ceremony. While, in Ethiopia, the timing of weaning depends on the season, the preferable season is winter when barley is abundance (Ahmed and Zeitlin 1994; Ebrahim, 2003).

Food-based Dietary Guideline

Providing sound and culture-specific nutrition counseling to mothers of young children and recommending the widest possible use of indigenous foodstuffs will help ensure that local foods are prepared and fed safely in the home suggested by WHO. Using locally available ingredients will be a decent alternative for providing low-cost-complementary foods.
The Food-based Dietary Guideline (FBDG) can be used for this purpose. There are many reasons for developing and using FBDG, as food and diets have cultural, ethnic, social and family aspects that are important in acceptability of these foods for consumption. The FBDG can encourage dietary patterns that include expected nutrients. The FBDG should based on what can realistically be achieved in the socioeconomic and cultural context rather than on attempt to eliminate in one step the entire difference between desired and actual intake. FBDG also should be formulated in simple, realistic, regionally specific, culturally appropriate and take into account the multiple factors influencing food choice.
In Indonesia the FBDG has been used to develop complementary feeding recommendations (CFR) in which they are more likely to result in long-term improvement in complementary feeding practices than general recommendation for all Indonesian children.

Examples of CFR for 9-11 months children in East Lombok and South Bogor

East Lombok	South Bogor
Breast-feed daily on demand	Breast-feed daily on demand
At least 3 servings of staple per day	At least 3 staples/day, including: 1 serving/day of fortified infant cereal 5 serving/week of tempe or tofu
At least 3 servings of tempe or tofu a week	At least 3 servings/ week of animal protein, including: 2 serving/week of chicken liver
At least 3 servings of animal protein a week, including: 1 serving of 1 boiled chicken liver a week and 1 serving of 2 table spoon of dried anchovy a week	
Vegetable every day	At least 1 serving/day of vegetables
At least 3 snacks per day, including: 6 serving of 2 yellow banana a week	At least 2 servings/day of snack, including: At least 2 servings/week of banana 4 servings/week of fortified biscuits

Source: WHO, 1998 ; WHO, 2003; Fitriyanti 2005, Santika 2009

Summary

The period of complementary feeding carries a high risk of nutritional deficiency. To understand complementary feeding, attention needs to be paid to behavior surrounding feeding and to any constraints to care, such as social, economic and cultural context, not just to the nutritional aspect of complementary feeding.

Case study:

Bhat-dhara tradition in Bangladesh

Bhat-dhara means "catching rice", a cultural milestone in Bangladesh, indicating the child's readiness for family meals (adult diet). The system is believed to contribute to malnutrition profile of Bangladesh. Malnutrition is related with late *bhat-dhara*. Childhood malnutrition and mortality rates in Bangladesh are among the highest in the world. Around 65% children aged 2 – 5 years are stunted and 72% children aged 6 – 71 months are underweight.

The study identified two stages in introducing food, when the child reached 1 year old, rice was officially introduced and when the child reached 2 years old, rice became the main part of the child's diet. The progressive integration of the child's meal into family meal circle is occurred in 18 – 24 months old. At the end of the study the researchers were aware of the presence of *bhat-dhara* tradition. Criteria for *bhat-dhara* include :

- eruption of two-year-old molars
- ability to walk
- ability to carry 1 – 2 kg weight
- ability to name and reach for food
- self-feed
- linear appearance

Normative stages of child feeding lead up to *bhat-dhara*. First, breast milk and milky liquid food (milky white liquid made with over-diluted milk, barley, shoti or rice powder and honey), may be given from birth. Followed by finger food (very small amount of candy, banana, cookies etc). Then, snack food (soft pitha, soft potato, rice porridge etc) came along. Initial rice meal (small amounts of rice with less spicy curry of lentils, potato etc) was introduced before complete *bhat-dhara* (family meal) present.

The process of *bhat-dhara* starts at two years of age with the participation in the family meal circle. The complete transition to adult meal is at 5-7 years of age. Mothers tend to underestimate the age of the children, thus causing late *bhat-dhara*. This practice was worsening by the use of calendar event, which prolong the delay of introducing complementary food. The other problem related to it was parents' perception. For them, too much or inappropriate food before *bhat-dhara* will cause child suffer from stomach upset, indigestion, worm infection, etc. And there will be no major problem if parents fail to notice time for *bhat-dhara* as long as milk like liquid, snack food and breast milk is given.

There was discrimination for food allocation of twins children, who one of them has reached *bhat-dhara* and the other not. For *bhat-dhara* the portion was 3.3 bigger than the pre-*bhat-dhara* child in normal times. Whereas, when there was food scarcity, the *bhat –dhara* child received 5 times higher that the other child.

Gender preference was also discovered. Girls reach *bhat-dhara* earlier than boys due to physical growth, hand coordination and speaking abilities. Due to economic constraints, the children receive *bhat-dhara* earlier, regardless their readiness, and almost all were girls. Early *bhat-dhara* is seen as a disadvantage (missing good food such as cookies, honey, milk powder, fruit, etc). However, *bhat-dhara* discrimination against girls' benefits them by introducing complete rice meals earlier. Girls' food intake was reported to be higher than boys' and 9-18 months old girls had higher WAZ than boys.

Source: Ahmed NU, Zeitlin MF, 1994.

Learning Activity 8.1.

Task: Design an intervention to address:

- Early complementary feeding
- Low quality of complementary food

Include:

- What activities will be done
- Who will be targeted
- For how long

References

Ahmed NU, Zeitlin MF. Bhat-dhara-catching rice: A folk milestone in the development of Bangladeshi children. An investigation of parental beliefs and decision-making in introducing young children to family meals. Ecol Food Nutr 1994; 32: 227-38.

Ebrahim GJ. Mother and child nutrition in the tropics and sub-tropics. 2nd edition of nutrition in mother and child health. London: Book Aid, 2005.

Fitriyanti S, Fahmida U, Wijaya M, Roshita A, Ferguson EL. Development of food based dietary guidelines for 6-11 month old infants using linear programming in East Lombok, West Nusa Tenggara. MSc Thesis. Jakarta: SEAMEO-TROPMED Regional Center for Community Nutrition, University of Indonesia, 2005.

Michaelsen KF, Weaver L, Branca F and Robertson A. Feeding and nutrition of infants and young children: Guidelines for the WHO European Region, with emphasis on the former Soviet countries. Denmark: WHO, 2000.

Pelto GH, Levit L and Thairu L. Improving feeding practice: Current patterns, common constraints, and the design of interventions. Food Nutr.Bull 2003; 24: 45-57.

Santika O, Fahmida U, Ferguson EL. Development of food-based complementary feeding recommendation for 9 to 11-months-old peri-urban Indonesian infants using linear programming. J.Nut 2009;139:135-141.

UNICEF. Challenge for a new generation: The situation of children and women in Indonesia. Jakarta: UNICEF, 2000.

WHO. Complementary feeding: Family foods for breastfeed children. France: WHO, 2000.

WHO. Guiding principles for complementary feeding of the breastfed child. Geneva: WHO, 2001.

WHO. Global strategy for infant and young child feeding. Geneva: WHO, 2003

WHO. Guiding principles for feeding non-breastfed children 6-24months of age. Geneva: WHO, 2005.

WHO. Preparation and use of food based dietary guideline: Report of a joint FAO/WHO consultation. Geneva: WHO, 1998.

CHAPTER 9

Nutrition in Transition

Judhiastuty Februhartanty and Duma Octavia Fransisca

Objectives:

1. To explore how food diffusion and acceptance is influenced by many factors such as urbanization, advance communication technology, increasing purchasing power and other socio economic issues.
2. To discuss the dynamic of dietary habits in modern society referred to as the nutrition transition and its consequences to the population's well-being.

9.1. Introduction

History gives meaning to the present and one way to get a good historical perspective on the changes that have taken place in eating patterns is to briefly review how our diets have changed.

Eating patterns have changed markedly during the past century. We not only eat different foods in different amounts, but we prepare our food differently. Our forefathers, several decades ago, ate basically the same staple foods in the same seasons as their ancestors did before them. Most of the food calories in their diets were from food grains, meats, animal fats, sugars, tubers, roots, and mature legumes. Fresh fruits and vegetables were eaten in season, but they were perishable, and transportation over long distances in the absence of refrigeration was impossible. In contrast, now, shifts in relative food prices, technological developments in food processing, packaging, and transportation, and rapid advancements of information communication technology (ICT), has made everything very possible, accessible, and quick. The consequences of this facilitated access to foods are taking its toll on individual diet and nutrition and greater awareness is required to mitigate the negative effects of this trend.

Increased consumption of unhealthy foods compounded with increased prevalence of overweight in middle-to-low-income countries is typically referred to as the "Nutrition Transition." It occurs in conjunction to the epidemiological transition and has serious implications in terms of public health outcomes, risk factors, economic growth and international nutrition policy. Nutrition transition is malnutrition ensuing not merely from a need for food, but the need for high-quality nourishment. Foods rich in vitamins, minerals, and micronutrients such as fruits, vegetables, and whole grains have been substituted by foods heavy in added sugar, saturated fat, and sodium. This trend, which began in developed, industrialized countries, has spread to developing countries which are still stressed and struggling with hunger, but are now dealing with health problems associated with obesity.

9.2. Food Diffusion and Acceptance

The way people and communities choose and consume certain foods has never been static. Since the pre-historic times, food crops and animals have diffused throughout the world. Types of foodstuffs have spread from one continent to another and from one community to another. These foods are so well established in some countries that people consider them to be indigenous. Food habits are changing constantly for better or worse, by external influences or by the developments from within the society itself.

What does "changing" mean? According to den Hartog et al (2006) the concept of changing food habits comprises the following elements:

- *Changes in the use of already known foods.* This can be the increase or even decrease in the use of known foods such as meat, dairy, or staple foods. The consumption of traditional foods could decline. In general, people tend to consume more food of animal origin, fats, fruits, and vegetables and less starchy staple foods as a result of increases in standards of living. It also means a modification or a sophistication of already known foods. Examples of this are industrially prepared local dished, fruit juices in bottles, and the substitution of traditionally brewed beers in tropical Africa by industrialized kinds of beer in bottles.
- *New food previously unknown added to the food pattern.* In the past, new foods have replaced traditional staple food in several regions of tropical Africa, e.g. sorghum and millet replaced by maize and cassava. In Papua New Guinea the staples such as yam, cassava, and bananas are increasingly being replaced by white rice and bread.
- *Changing attitude towards a food or a category of food.* In various societies and among population groups, one can observe a rise or fall in the appreciation for certain foods. Imported food products are often highly appreciated. The traditional appreciation for coarse foodstuffs is diminishing. People in urban areas prefer the white rice or bread. Even in countries with a strong culinary tradition such India and China, western kinds of fast food and pizza have obtained appreciation among young middle class consumers.

Thus, the diffusion and acceptance of new foods takes place at two levels. The first level is *the geographic or horizontal diffusion of food/food products*, from one continent or region to another. Second is the *vertical diffusion in the recipient society or country*, which is the acceptance of new foods among socio-economic classes or ethnic groups. So, why have previously unknown foods been accepted in the food pattern? Food diffusion and acceptance is complex. For a better understanding of the process of accepting new foods, den Hartog et al (2006) elaborate the following four major interrelated factors:

- The nature of the food: is it a staple, a condiment or a drink? Historically, the search for condiments such as black pepper, cloves, and cinnamon resulted in an improvement of the taste of the diet in Europe. It also has far reaching consequences for the relations between Europe and Asia in modern history.

- The degree to which a new food can be incorporated into the local food production system. Would it be possible to cultivate the new food locally or must it always be imported? Wheat, in the form of bread or biscuits, is now increasingly consumed in tropical countries, but wheat cannot be cultivated in the humid tropics due to the climate. This is one of the reasons why wheat did not become a dietary staple in these geographical zones. However, when the new food can fit into local farming systems or can be easily imported, it may have a considerable impact on the recipient society.
- Food culture is an important factor in the process of accepting a new food. A new food is more easily accepted when it fits into the prevailing concept of what is edible and when the local culinary techniques can be applied. The duration of the food preparation time also plays a role. There is a need for fuel saving foods because of firewood shortage. Taste and prestige are also important reasons for the acceptance of new foods, price in relation to purchasing power being the limited factor which will be discussed further in section 9.4.
- The role and power of the actors further determine the way and degree of food acceptance. In the past, colonial powers played a crucial role in food diffusion. Now, the contemporary food industries, both multinational and national, are important actors in the process of food diffusion.

Food Resistance: The soybean case

New foods are not always readily accepted among recipient populations and a resistance to change may arise when the advantages are not clear or absent.
The soybean in Asian countries such as China, Japan and Indonesia is an age-old food crop with a wide range of preparations and applications. The United States is currently the biggest exporter of soybeans.
The soy export industry has made various efforts to have soybean accepted into the diet in tropical Africa, which has stimulated local soy production. One of the arguments for its introduction is to contribute towards a reduction of protein deficiencies in the diet.
The soybean has received much resistance nevertheless. People often disliked the taste and soybean preparations needed more cooking time compared to indigenous beans, hence requiring more wood fuel.

Source: Den Hartog AP, Van Staveren WA and Brouwer ID, 2006.

Furthermore, den Hartog et al (2006) argue that the acceptance of a new food in the diet of a population can be considered as a food innovation. Two basic types of food innovation can be distinguished:

- an expensive innovation
- an emergency innovation

Expensive food innovations are first adopted by the upper classes of a society. Through close contacts, and considering the upper class as a point of reference, foods often move down social scale to the middle and lower classes. This process will be stronger in periods of rising standards of living and with improved production and access to mass

transport. On the other hand, food innovations may also occur during periods of economic distress. Cassava and maize, for example, were accepted in Indonesia and Africa respectively out of emergency needs, as the production of traditional foods could no longer ensure food security. These foods were introduced to the diet of the middle and upper classes from the lower classes. Whisky is another example. Once a drink of poor Irish and Scottish farmers, it is now a prestigious drink in many countries.

(p)

Figure 9.1. Vast soybean farm spread throughout Minnesota, US

a. Urbanization

With urbanization, people keep moving from rural areas to the cities. The world is experiencing greater urbanization in general. Den Hartog et al (2006) state that from a food and nutrition point of view, this process of urbanization implies a number of questions and points of concern.

- *How will an increasing non-food producing population be fed?*
- *How will the quality of the diet be maintained and improved?*
- *In which way is the local food industry in opposition to produce food products suitable for the urban way of life, with special reference to the low-income consumer?*

The question then becomes, why are urbanities so receptive to new food and food products as compared to rural populations, despite similar incomes?

- A basic difference is that nearly all food in the city has to be bought. The urban household is no longer a primary food-producing unit and its members are modern consumers in the making. Urbanities can more easily make individual food choices.
- Compared to rural areas, the city is supplied with a much greater variety of food throughout the year through the marketing system. Seasonality in the food supply is less profound.

- Long working hours and separation between residence and place of work make the urbanite receptive to food that is easy to prepare, saves time, and also takes less fuel. A related aspect is that housing conditions are often not favorable for the traditional food preparation methods at home. Food advertising and other marketing activities, supported by an efficient network of retail outlets, small shops, and market places stimulate the purchase of all kinds of food.

Table 9.1. Trends in the shift of major food stuffs in Africa south of the Sahara

Type of community	Kind of food
Rural community ▪ Largely food subsistence	▪ Yam, millet, and sorghum ▪ Sorghum beer, palm wine ▪ Wild (bush) foods
Rural community in change ▪ Mainly cash cropping	▪ Cassava or maize ▪ Soft drinks, traditional and bottled beer ▪ Some tinned food
Urban community	▪ Rice, bread, and other wheat products ▪ Street foods ▪ Compared to rural communities, more vegetables and fruit, meat and fish ▪ Tinned (canned) foods ▪ Soft drinks, bottled beer ▪ Hard liquor and wine

(**Source**: modified from den Hartog et al, 2006)

The dynamics of the urban food lifestyle is strongly influenced by three reference points: the traditional rural background, urban socialization and individualism (Bricas 1994 in Den Hartog et al, 2006). Much of the food preparation methods and dishes in the household resemble the original rural and cultural background of the family. Ties to the place of origin become looser with the second and third generation living in the city. As part of the process of urban socialization, new kinds of work and practices, new social relations, and daily exposures to an influx of new ideas and advertising message force the urbanite to alter a part of his food habits. These elements are markers of the urban way of life. Furthermore, a phenomenon closely associated with urbanization is the rise of individualism. The family bond is becoming weaker and individuals can escape more easily from family control. Outside the household, the urbanite can make individual food choices, not hindered by relatives. Meat has to be shared with others at home, but in a food stall or a roadside restaurant one can consume as much as is purchased. This process of individualism also leads to another social phenomenon, which is the weakening of care for the elderly by younger family members. This happens when most of the productive-aged family members encounter economic stress, requiring them to work outside home. This economic responsibility borne by younger family members has resulted in the transfer of caring for the elderly to others and this caring is further perceived as burdensome and costly.

Den Hartog et al (2006) also explain that beside changes in food consumption, the transition of urban food habits includes the phenomenon of eating out. Eating out is for many households a necessity when setting off for work or during working hours. People will certainly enjoy their food, but eating out as a form of entertainment is new. Eating out for leisure is a habit that arises among the upper middle-class. Thus, there is

an equilibrium of demand and supply that develops. Interestingly from the supply side, of all food outlets outside home, street food are the most popular among the urbanite of various socio-economic backgrounds. The significance of street foods to urban way of life can be approached from three levels:

- As an employment opportunity, particularly for women in the informal sector, permitting the development of small-scale urban entrepreneurship. Children are also employed in the street food sector by selling bread, sweets, or cleaning the utensils and stools of makeshift roadside restaurants. However, the employment of children remains a point of concern from the point of view of children's rights.
- Food technology and the necessity to give attention to food control, hygiene, and other aspects of quality. Street foods may stimulate the development of an artisan or small-scale food industry and appropriate food technology. Street foods are usually consumed as a snack or meal on the roadside, and also at home. They varies from a ready-prepared staple or an ingredient which needs to be added with side dishes at home, to a complete meal prepared specially for the urbanites who are fond of simplicity and practicality.
- The nutritional dimensions of street foods, such as their contributions to nutrition and health of the consumer, and the extent to which street foods correspond with consumer needs. For example, street foods are found to provide up to 59% of the daily energy and nutrient intake of urban market women in Nigeria and a median range of 13% - 36% among subjects living in low-income areas in Nairobi. Similar figures of the latter are also found among slum dwellers in Hyderabad (India) and Haitian school children.

(q)

Figure 9.2. Various foods available on the street at night in Bangkok

In addition, migration and urbanization certainly pose questions related to socio-economic class such as: *In which direction is the urban trend, towards less access to food for low-income population groups or leading towards an urban affluent society?* Table 9.2 shows how food habits and nutrition issues differ among various socio-economic groups in urban areas in resource poor settings.

Table 9.2. Food habits and nutrition issues among different socio-economic group living in urban areas in developing countries

Socio-economic group	Food habits and nutrition issues
High	
Industrialists, top managers, high-ranking civil servants	▪ Varied diet such as meat/fish, dairy, eggs, vegetables and fruit, high consumption of imported food ▪ Restaurants and modern fast food ▪ High intake of energy, protein, and fat; low physical activity, obesity ▪ Increase of diabetes, cardiovascular diseases, other diet-related non-communicable diseases
Middle	
Professionals, lower civil servants, small entrepreneurs	▪ Much in common with the high socio-economic groups, purchasing power is limiting factor ▪ Good quality street foods, modern fast food ▪ Moderate physical activity, obesity is an issue
Low	
▪ Mainly unskilled irregularly employed workers, high rates of unemployment ▪ Workers informal sector ▪ More than 40% of total urban residents living in slums	▪ Food insecurity ▪ Monotonous starchy diets ▪ Low quality street foods ▪ More than 60% of total expenditure on food ▪ High rates of infant and maternal malnutrition

(**Source**: den Hartog et al, 2006)

b. Rapid advancements on information communication technology (ICT)

The invention of the internet in the 1970s and the development of the World Wide Web in the late 1980s have changed the way people communicate, think, and very profoundly changed people's way of life. It has been described to have led to a de-humanizing of human interactions. These advanced technologies have allowed communications where it is unclear who the sender or recipient actually is. Teens, young adults, and professionals are commonly seen now to chat in public café with their laptops on the coffee tables. Hotspots or wireless internet connection are available now in public places and have become a necessity of urban life. The advent of low-cost mobile phones which feature internet connection has also altered the way people categorize basic necessity and luxury goods. Mobile phones are a necessity, as individuals feel a substantial loss if they are not able to readily communicate without it. Use of mobile phones is not merely part of life among urbanite but in growing numbers also among rural communities. The need to stay in contact leads to this new way of living in rural areas especially when geographical boundaries become a limiting factor for physical contact.

An example comes from the earthquake and the strike of tsunami in Nanggroe Aceh Darussalam (Indonesia) in late 2004. This natural disaster resulted in the massive use of mobile phone among the survivors as the investment of the infrastructure is much

easier and affordable in such damaged areas compared to conventional paid home telephone.

(r)

Figure 9.3. Small children are now mobile phone users in most parts of Jakarta

From a nutrition and health point of view, it is unclear about how all these advancements benefit or harm the society. With increased global communication, the world "becomes flat" as it is much easier to get information than ever before. Thomas L. Friedman's experience in Bangalore made him realized that the playing field is being leveled. This is to say that there is no more dichotomy of: developed or developing countries. What exist now is whoever has access and control over the available information will win "the war" (Friedman, 2006).

Furthermore, the internet has made nutrition and health information easily available. Scientific research findings are accessible as well as nutritional viewpoints from all over the world. People understand the importance of food and nutrition and how it affects their ultimate health status. Needless to say that with such lack of nutrition and food policy, people now are able to decide what is good for them.

An important positive example is seen with trans fatty acid. The process of hydrogenated adds hydrogen atoms to *cis*-unsaturated fats, eliminating a double bond and making them more saturated. These saturated fats have a higher melting point, which makes them attractive for baking and extends shelf-life. However, the process frequently has a side effect that turns some cis-isomers into *trans*-unsaturated fats instead of hydrogenating them completely. Unlike other dietary fats, trans fats are not essential, and reported not to promote good health. The consumption of trans fats increases one's risk of coronary heart disease by raising levels of "bad" LDL cholesterol and lowering levels of "good" HDL cholesterol. The news on kinds of manufactured foods containing this harmful substance is enough to make some consumers stop buying such food products. For some curious consumers, they would go for further searching of credible source of information, before they are to take some necessary actions. The

issue had become a topic of discussion among scientists and lay people in the internet. Health consciousness induced by e-groups and available health and nutrition information at finger tip for netters have created quite a number of online for discussing and arguing such information publicly. Another benefit on advance communication technology is that people don't have to go to the sites to know about other people's culture, local foods, food technology, cooking methods, food festivals or even food borne disease outbreak information. People can also share their daily experience and feeling regarding food to their friends and relatives in their e-groups or social networks. The latter might influence others to perform the same as well.

On the negative bad side, is the potential to make people less able to interact face-to-face. Even in a meeting people tend to include their mobile phone active to make "justifiably-necessary" text messages or internet browsing. A new trend is when people become a member of an online social network; they tend to get addicted of spending some time updating their status and information in the network, and unconsciously increase the likelihood of reducing physical activities, increasing snack habits, and to a certain extent - reducing healthy eating patterns.

Was this the New World, the Old World, or the Next World?

"I was standing on the first tee at the KGA Golf Club in downtown Bangalore, in southern India, when my playing partner pointed two shiny glass-and-steel building off the distance, just behind the first green. HP and Texas Instruments had their offices on the back nine, along the tenth hole. That wasn't all. The tee markers were from Epson, the printer company, and one of our caddies was wearing a hat from 3M. Outside, some of the traffic signs were also sponsored by Texas Instruments, and the Pizza Hut billboard on the way over showed a steaming pizza, under the headline "Gigabites of Taste!"
No, this definitely wasn't Kansas. It didn't even seem like India. Was this the New World, the Old World, or the Next World?"
- Thomas L. Friedman -

Source: Friedman TL, 2006.

The above quote from Thomas Friedman is just an analogy that we are taking part in creating the world "the same everywhere" – that is flattening the world. Most of us witness that we now read, think, and even eat as much alike as what people from the other parts of world do. Examples to this phenomenon are the vegetarians, Okinawa dieters, or even Mediterranean dieters who exist throughout the globe. The reported positive effects to the health of the natives who have long been practicing such diets have created much awareness from people across the world and resulted in many followers beyond its place of origin.

9.3. The Modern Food System

A visit to any supermarket, with its elaborate displays of food from many parts of the world, is a readily available demonstration of the choice and variety available to the modern consumers. The supermarket itself may be considered one of the most

successful outcomes of the development of modern systems of food production and distribution, indicating the extent of control over quality and the reliability of supplies.

In trying to understand the developments and beliefs which underpin the modern food system, we are faced with a fascinating paradox. In the past, certainly in the West, ascendancy over the natural world was taken for granted, yet it was not always possible to use that ascendancy to provide constant and reliable supplies of food. However, in modern society, where food supplies are virtually guaranteed, there are now serious doubts about the extent and moral acceptability of our control over the natural environment. In parallel with the technological, engineering, and scientific changes which have established control over food production and distribution, serious debate has emerged about the unanticipated consequences of such changes, together with challenges to the allegedly overconfident exploitation of the natural resources (Beardsworth and Keil, 1997).

The use of the term "food system" may conjure up an idea of a formally organized set of links between food production, distribution, and consumption which draw attention to the particular character of the complex of interdependent interrelationships associated with the production and distribution of food which have developed to meet the nutritional needs of human population. In trying to understand the making of the modern food system, it is necessary to be aware of both continuity and change in the social processes which shape the ways in which food is produced, distributed and consumed. This understanding includes the main contrasts between the food systems of traditional and modern societies as jotted in Table 9.3 (Beardsworth and Keil, 1997).

Table 9.3. Contrasts between traditional and modern food systems

Activity	**Traditional systems**	**Modern systems**
Production	Small-scale/limited	Large-scale/highly specialized/industrialized
	Locally based for all but luxury goods	De-localized/global
	High proportion of population involved in agriculture	Majority of population have no links with food production
Distribution	Within local boundaries	International/global
	Exchange governed by kinship and other social networks	Access governed by money and markets
Consumption	Swings between plenty and want dependent on harvests and seasons	Food always available at a price/independent of seasons
	Choice limited and dependent on availability and status	Choice available to all who can pay
	Nutritional inequalities within societies	Nutritional inequalities between and within societies
Beliefs	Humans at the top of the food chain/exploitation of the environment necessary	Debate between those who believe in human domination of the environment and those who challenge such a model

The documentation of the transformation from the traditional to the modern food system has attracted the efforts of social historians, economists, and nutritionists using a variety of approaches. The process of urbanization in the ancient world had already broken the direct links between food production and consumers and had

provided the necessary stimulus for developments in food production. However, it was the process of industrialization which altered the scale of urbanization, created an unprecedented demand for food supplies and distanced urban populations yet further from the sources of their food. There is no doubt that industrialization 'created machines, factories, and vast suffocating cities' (Beardsworth and Keil, 1997). D.J. Oddy in 1990 (Beardsworth and Keil, 1997) argues that this rapid urbanization in the eighteenth century was a major contributor to the commercialization of food markets, since urban living, with its pattern of waged work and separation from agriculture base, prevented greater populations than ever before from being self-sufficient in food. As these urban centers grew, the food demands of such concentrations of population could not be met from local resources, however efficiently organized. This precipitated the rapid growth of trade longer distances in produce such as livestock and vegetables.

Two distinct trends in the process of food system urbanization and globalization can be recognized as stated by FAO in 2004 (Den Hartog et al, 2006).

- *Dietary convergence*. This refers to the increasing dietary similarities in energy and nutrient composition between those of the industrialized countries and the diets of the emerging middle classes of developing countries. Both are characterized by overnutrition.
- *Dietary adaptation*. This reflects the change of diet under pressures from the urban lifestyle. It is characterized by a greater reliance on staple grains such as wheat and rice, as well as the increased consumption of meat, dairy products, edible oils, salt and sugar.

It is of importance to realize that dietary convergence takes place within the indigenous food culture and the modern urban diet is not just a copy of Western food culture. Dietary acculturation, the process by which groups and individuals adapt to the other dietary habits and take it as their own dietary habits, is taking place and is linked with globalization and urbanization. People increasingly incorporate new foods and dishes into their diet. This process is not limited only to urban areas; similar developments can also be found in rural areas.

9.4. Purchasing Power and Food Consumption Behavior

Many years ago there was no need to look constantly for money, for then there was plenty of food. The earth gave us a lot of the food. Today more than ever, all of us realize that we must constantly look for money if we are to eat. As society has grown more and more complex over time, few of us grow our own food. Instead, we must purchase in the market the foods that we consume. Whether we eat or not depends on whether we have money in hand with which to purchase food. Our power to purchase foods depends on our income (Sanjur, 1982).

The rich and the poor alike have one thing in common: they all have a limited income, even though that number is significantly higher for the rich. But all must decide how to spend their incomes among alternative uses, such as food, clothing, housing, vacation trips, and education. These decisions are obviously less cumbersome for the rich than for the poor. In regard to food, further decisions must be made as to how much income to spend on different foods. Purchasing power determines to a large extent how much income is spent on food, but how those expenditures are allocated among different foods involves a number of social and cultural factors. Food

consumption behavior is a reflection of strong interactions among economic and socio-cultural factors (Sanjur, 1982).

Furthermore, Sanjur (1982) mentioned that household spending behavior (including food expenditures) depends on three key economic variables: the household's purchasing power, its size and composition, and market prices for food and nonfood goods and services. A more complete functional relationship also would include other variables such as food habits and beliefs, food preferences, and environmental factors.

- *The household's purchasing power* can be defined in different ways such as gross income, disposable/net income, permanent income, and net wealth. Most closely related to current levels of spending is the household's disposable income. The concept of permanent income suggests that current levels of household spending are not only dependent on current disposable income but also on past and expected future income levels. In addition, the net wealth position of the household may add long-run stability to total spending levels of middle- and upper-income classes. Because income and wealth data are typically difficult to obtain and have questionable validity, other variables that define household's socioeconomic status are often substituted as proxies for household purchasing power data.
- *The household size and composition* is likely to be related to its expenditure patterns. Household size and composition and income levels are often positively related. To separate the effect of income on spending behavior from the effect of household size and composition requires the quantification of the latter, often by means of equivalent adult scale, which assigns different weights to household members on the basis of their sex and age. The weights assigned to each member should reflect their relative importance in sharing in total expenditures or in the expenditure on foods or on a particular food.
- *Market prices of goods and services*, together with household's income level and its net wealth position, determine the household's real purchasing power. Expenditure pattern change over time in response to changing market prices. Separating the effect of changing prices on expenditure patters from the effect of changes in purchasing power usually requires the construction of a price index. Changing food purchasing patterns over time are likely to reflect strong interactions between changing food process and such factors as food habits and preferences.

Engel's Law quantitatively relates income levels to food spending behavior. This law predicts that at higher income levels, total food expenditures increase in absolute terms but decrease as a percentage of total income. Out of each additional increment in income, an increasingly smaller proportion is spent on food. Evidence presented from households in countries as different as India and the United States generally support Engel's Law. However, in the United States, household size and composition may exert a greater influence on food spending behavior than income (Sanjur, 1982).

Significant changes in the composition of food expenditures accompany increases in total food expenditures and income. At low levels of income, a high percentage of total food expenditures is allocated for staple foods such as cereals. As

purchasing power rises, an increasingly higher percentage of total food expenditures is for milk and dairy products and meats, and expenditures for staple foods either decline as a percentage of total food expenditures or decrease in absolute terms. At high income levels, even expenditures for dairy products and meats become less sensitive to further income increases (Sanjur, 1982).

9.5. Transitional Changes in Demography, Nutrition, and Health

The nutrition-related non-communicable diseases (NR-NCDs) were once referred to as diseases of affluence. For decades this has been true among higher-income countries, and as we now show, this is increasingly the case in the lower- and middle income countries (Popkin, 2002).

Two historic processes of change occur simultaneous to, or precede the nutrition transition. One is the demographic transition – the shift from a pattern of high fertility and high mortality to one of low fertility and low mortality (typical of modern industrialized countries). Even more directly relevant is the epidemiological transition, first described by Omran (1971): the shift from a pattern of high prevalence of infectious diseases associated with malnutrition, and periodic famine and poor environmental sanitation, to a pattern of high prevalence of chronic and degenerative diseases associated with urban–industrial lifestyles. A third pattern of delayed degenerative diseases has been formulated more recently (e.g. Olshansky and Ault, 1986 in Popkin, 2002). Accompanying this progression is a major shift in age-specific mortality patterns and a consequent increase in life expectancy. Interpretations of the demographic and epidemiological transitions share a focus with the nutrition transition on the ways in which populations move from one pattern to the next. Similarly, large shifts have occurred in dietary and physical activity and inactivity patterns. These changes are reflected in nutritional outcomes, such as changes in average stature and body composition. Modern societies seem to be converging on a pattern of diet high in saturated fat, sugar and refined foods and low in fiber – often termed the 'Western diet'. Many see this dietary pattern to be associated with high levels of chronic and degenerative diseases and with reduced disability-free time. These three relationships are presented in Figure 9.4 (Popkin, 2002).

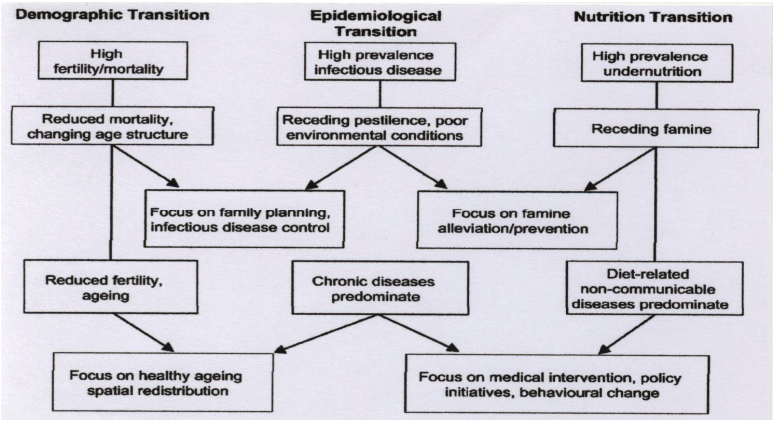

Figure 9.4. Stages of health, nutritional, and demographical change
(**source**: Popkin, 2002)

Human diet, activity patterns and nutritional status have undergone a sequence of major shifts, defined as broad patterns of food use and their corresponding nutrition-related diseases. Over the last three centuries, the pace of dietary and activity change appears to have accelerated, to varying degrees in different regions of the world. Further, dietary and activity changes are paralleled by major changes in health status, as well as by major demographic and socio-economic changes. Obesity emerges early in these shifting conditions as does the level and age composition of morbidity and mortality. We can think of five broad nutrition patterns. They are not restricted to particular periods of human history. For convenience, the patterns are outlined as historical developments; however, 'earlier' patterns are not restricted to the periods in which they first arose but continue to characterize certain geographic and socioeconomic sub-populations.

- *Pattern 1: Collecting Food*. This diet, which characterizes hunter–gatherer populations, is high in carbohydrates and fiber and low in fat, especially saturated fat (Truswell, 1977; Harris, 1981 in Popkin, 2002). The proportion of polyunsaturated fat in meat from wild animals is significantly higher than in meat from modern domesticated animals (Eaton et al., 1988 in Popkin, 2002). Activity patterns are very high and little obesity is found among hunter–gatherer societies. It is important to note that much of the research on hunter–gatherers is based on modern hunter–gatherers as there is much less evidence on pre-historic people.
- *Pattern 2: Famine*. The diet becomes much less varied and subject to larger variations and periods of acute scarcity of food. These dietary changes are hypothesized to be associated with nutritional stress and a reduction in stature (estimated by some at about 4 inches (Eaton and Konner 1985; Vargas 1990 in Popkin 2002). During the later phases of this pattern, social stratification intensifies, and dietary variation increases according to gender and social status (Gordon 1987 in Popkin 2002). The pattern of famine (as with each of the patterns) has varied over time and space. Some civilizations are more successful than others in alleviating famine and chronic hunger, at least for their more privileged citizens (Newman et al 1990 in Popkin 2002). The types of physical activity changed but there was little change in activity levels during this period.
- *Pattern 3: Receding Famine*. The consumption of fruit, vegetables and animal protein increases, and starchy staples become less important in the diet. Many earlier civilizations made great progress in reducing chronic hunger and famines, but only in the last third of the last millennium have these changes become widespread, leading to marked shifts in diet. However, famines continued well into the eighteenth century in portions of Europe and remain common in some regions of the world. Activity patterns start to shift and inactivity and leisure become part of the lives of more people.
- *Pattern 4: Nutrition-related Non-communicable Disease*. A diet high in total fat, cholesterol, sugar and other refined carbohydrates, and low in polyunsaturated fatty acids and fiber, and often accompanied by an increasingly sedentary life, is characteristic of most high-income societies (and of increasing portions of the population in low-income societies).

This results in increased prevalence of obesity and contributes to the degenerative diseases that characterize Omran's final epidemiological stage.

- *Pattern 5: Behavioral Change*. A new dietary pattern appears to be emerging as a result of changes in diet, evidently associated with the desire to prevent or delay degenerative diseases and prolong health. Whether these changes, instituted in some countries by consumers and in others also prodded by government policy, will constitute a large-scale transition in dietary structure and body composition remains to be seen (Milio 1990, Popkin et al 1977, Popkin et al 1992 in Popkin 2002). If such a new dietary pattern takes hold, it may be very important in enhancing 'successful ageing'; that is, postponing infirmity and increasing the disability-free life expectancy (Manton and Soldo 1985, Crimmins et al 1989 in Popkin 2002).

Our focus is increasingly on patterns 3 to 5, in particular on the rapid shift in many of the world's low- and moderate-income countries from the stage of receding famine to NR-NCD. Figure 9.5 presents this focus. The concern about this period is so great that the term the Nutrition Transition is synonymous, for many, with this shift from Pattern 3 to 4.

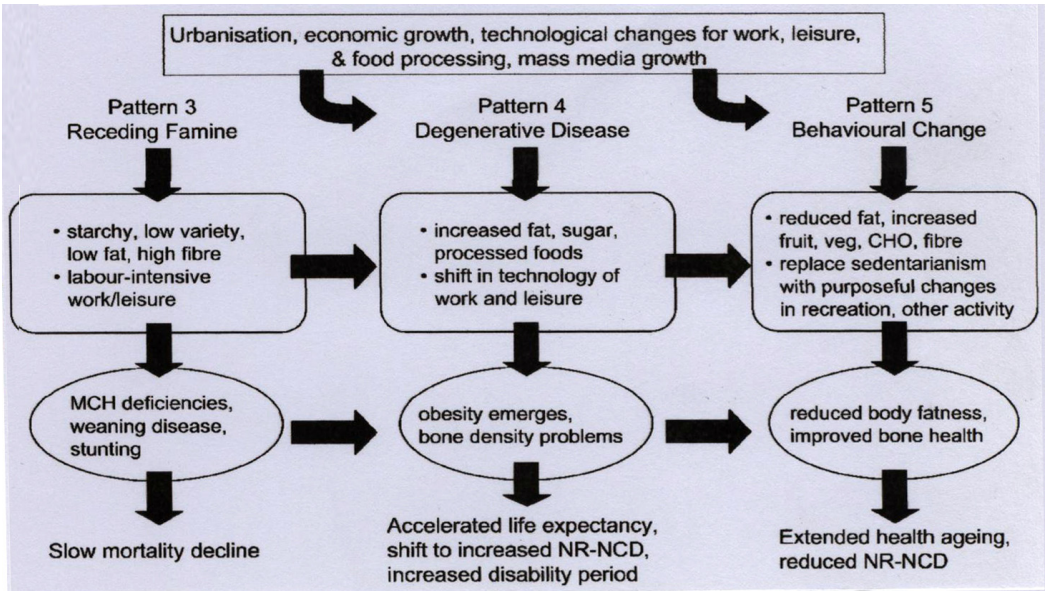

Figure 9.5. Stages of the nutrition transition (**source:** Popkin, 2002)

Summary

People migrate from one place to another, and take their cultures with them. In a place where culture(s) dominate others, the people have to adapt to the dominant cultures. It happens also with human dietary habits. People try to perceive their food habits but environmental conditions have influence in shaping up our new habits.

Among the urbanite societies, many have to adapt their dietary habits due to socio economic reasons, available foods, and media influences. People share experiences through technologies. TV, telephone and the internet have made the world seem smaller and more equal.

The type and amount of foods consumed by individuals and/or household members, physical activities and other lifestyle are influenced by this globalization concept. Diet becomes more convergent than before and may result the increasing of non communicable diseases prevalence especially in the rural. As community nutritionists, this condition provides a challenge for us how we can use the technology to promote healthy lifestyle for the community.

Case study:

Dietary Globalization in Southeast Asia

Dairy products are not the only European foods that have been absorbed into Southeast Asian diets. Changes in food habits and food availability are responsible for the modern "toxic food environment", according to media reports in Malaysia and Thailand. Climbing obesity rates are blamed on western fast food chains. Problematic foods are identified as those high in salt, sugar, and fat, and include instant noodles, deep-fried chicken, pizzas, hamburgers, french fries, doughnuts, cookies, and cakes. These mouth-watering edibles are found everywhere, leading to increasing rates of coronary hearth disease, diabetes, hypertension, and to some extent, cancer. Heart disease and cancer, diseases of the affluent, are now the primary causes of death in Thailand. Half the Thai population over 60 years suffers from hypertension and the diabetes rate in Thailand is even higher than in EU countries.

For the most of Southeast Asia, food security (quantity) concerns have been replaced by concerns about food safety (quality and sustainability). And improvements in food safety are as much about trade as health. For example, New York City's ban on trans fats has 'trickled down' to other countries, as consumers add concerns about trans fats to concerns about calories and cholesterol. Companies in Southeast Asia that export food to North America are now testing for trans fats to meet FDA labeling requirements. Packages of instant red, yellow, and green curry pastes are considered at risk for trans fats and saturated fats, but they are more likely to be packaged for export than used locally where wet markets provide a wide range of fresh flavor pastes for purchase.

Western foods and fast food chains are often blamed for changes in food consumption patterns. But western-style fast food restaurants in the cities of Southeast Asia are more appreciated for their air-conditioning and clean bathrooms that the taste of their food offerings, and are more popular among teenagers than adults. Nor are these changes in food consumption practices simply the result of changing tastes among the Southeast Asian public. The Thai government, for example, favored companies that reduced the costs of meats, fats, oils, and sugars. Now powerful businesses in these sectors are increasing their profits by producing ever-cheaper and poor-quality foods, meals, snacks, and drinks.

In the modern cities of Malaysia, rising obesity rate have also replaced problems of undernutrition. Some attribute this to the 'rubbish foods' appearing in school cafeterias where hot dogs and cakes have replaced rice and bananas. Obesity rates for children and adults are doubling every few years in some parts of the world. Food insecure countries without access to western foods and fast food chains are also adversely affected by trade. The smallest markets in uplands of Burma, Thailand, Lao PDR, and Vietnam sell candies and cakes, along with small packets of infant formula, all imported or smuggled in from China. School vendors who used to sell bananas and fruit to schoolchildren now offer them these cheap processed foods.

But the experience of modernity and the fear of toxic modern foods are countered by an equally strong counter process. New consumer demands for healthy foods – clean, organic, and sustainable – are encouraging the development of a new range of products. Thailand wants to be the "Kitchen of the World", but ranks 13th in Asia among organic food producers. Yet demand for organic food is rising rapidly in parts of Southeast Asia, as elsewhere in the world. Retailers double the price of organic produce because they know that the urban middle class and elites will pay the price. However, much of the produce labeled organic is really grown conventionally. Other organic foods such as asparagus are shipped directly to niche markets in Europe.

In spite of food scares, malnourished infants, and overweight adults, Southeast Asian cuisines, in addition to being tasty, are overwhelmingly healthy. There are few food cultures

more ideally suited to human health than those based on rice, fish, fresh vegetables, and fruit. What make Southeast Asian food cultures among the healthiest and most appealing in the world? Their experimental approaches to new tastes; an ethos of moderation and the middle way; high standards of personal and kitchen hygiene; an emphasis on contrasting flavors rather than supersized portions; a preference for fresh rather than processed ingredients; and meal formats that allow meals and mouthfuls to be individualized and personalized. All these valuable traits show a unique approach to food. Throughout Southeast Asia, in the villages and cities, people take intense pride in local ingredients and have a willingness to experiment with someone else's local and make it their own – a truly global approach to food and eating.

Source: Van Esterik P, 2008.

Learning Activity 9.1. The concepts of food diffusion and acceptance tell us how we can adapt and/or resist new food.

Task: Using the concepts of food diffusion and acceptance, try to explain what is happening in the picture below.

(s)

Learning Activity 9.2. Dietary pattern is among other influenced by childhood habit and newly-developed sense of food preference in adulthood. At this point, the concepts of food diffusion and acceptance tell us how we can adapt and/or resist new food.

Task: Using the concepts of food diffusion and acceptance in an inter-culture marriage family, try to explain:

1. what happen to the dietary pattern of the new family?
2. who is more adaptive:
    a. male vs female family member?
    b. child vs adult family member?

Learning Activity 9.3. Conduct a short observation on one type of street food vendor around our Campus. Please choose one buyer as your informant and conduct as a short informal interview.

Tasks:

a. Describe the characteristics of your informant (gender, age, educational background, occupation etc).
b. Describe the reason s/he choose to consume the foods. Whether the food originally their daily or traditional food? How s/he can accept that kind of foods?

References

Beardsworth A and Keil T. Sociology on the menu: An invitation to the study of food and society. London: Routledge, 1997.

Den Hartog AP, Van Staveren WA. and Brouwer ID. Food Habits and Consumption in Developing Countries: Manual for Field Studies. Wageningen: Academic Press, 2006.

Friedman TL. The world is flat: The globalized world in the twenty-first century. London: Penguin Books Ltd., 2006.

Omran AR. The epidemiologic transition: a theory of the epidemiology of population change. The Milbank Memorial Fund Quarterly 1971; 49 (4): 509–538.

Popkin BM. An overview on the nutrition transition and its health implication: the Bellagio meeting. Public Health Nutrition 2002; 5(1A): 93–103.

Popkin BM. The nutrition transition in developing world. Development Policy Review 2003; 21 (5-6): 581-597.

Sanjur D. Social and cultural perspectives in nutrition. New Jersey: Prentice-Hall, Inc., 1982.

Van Esterik P. Food culture in Southeast Asia. Westport: Greenwood Publishing Group Inc., 2008.

CHAPTER 10

Socio-Cultural Aspects in Dietary Assessments

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Objectives

1. To review on dietary assessment i.e. available methods and factors guiding the choice of method.
2. To discuss culture-related issues and other issues to be considered when conducting dietary assessment.
3. To give illustrations of the application of culture-sensitive dietary assessment.

10.1. Introduction

Dietary assessment method is used to assess the first sign of any nutritional deficiency i.e. dietary inadequacy. Because of this reason information from dietary assessment can also predict possible nutrient deficiencies which can be further confirmed by other methods such as biochemical, anthropometry and clinical assessments. Dietary information is also useful for developing food intervention such as food-based dietary guideline.

Some major reasons for measuring diet include:

- To assess and monitor food and nutrient intake, e.g. ensuring adequacy of the food supply, estimating the adequacy of nutrient intakes of individuals/groups, monitoring trends in food and nutrient consumption, and estimating exposure to food additives and contaminants
- To formulate and evaluate government health and agricultural policy, e.g. planning food production and distribution, establishing food and nutrition regulations, establishing programs for nutrition education and disease risk reduction, evaluating the success and cost-effectiveness of nutrition education and disease risk reduction programs
- To study the relationships between diet and health, and to identify groups at risk of developing diseases because of their diet and/or nutrient intake (epidemiological studies)
- To assist in commercial purposes, i.e. developing advertising campaigns or new food products

10.2. Review on Dietary Assessment Methods

Food consumption can be assessed at national, household and individual levels.

a. Food consumption at national level

Food consumption information at national level can be obtained using Food Balance Sheets, Total Diet Study and universal product codes and electronic scanning devices. **Food balance sheets** (FBS) provide data on national food availability and can be used to calculate annual per capita food (or energy) availability in a country. FAO annually provides information from 176 countries, providing data on the amounts of 95 food commodities in the following food groups: cereals, starchy foods, sugar crops, sugar and sweeteners, pulses, tree nuts, oil crops, vegetable oils, vegetables, fruits, stimulants (coffee, tea, cocoa), spices, alcoholic beverage, meat, edible oils, animal fats, milk, egg, fish and seafood, other aquatic products, and miscellaneous. Domestic supply, domestic utilization, per capita yearly supply (kilogram/cap. year) and per capita daily supply (as calorie, gram protein and gram fat per capita per day) are provided for each of the food items and as total (grand total, total of vegetal products and total of animal products). Domestic supply includes information on production, import, stock and export; whereas domestic utilization includes utilization as non-food usage (feed, seed), manufacturing, predictable waste, uses and food. FBS has been used in estimating risk of zinc deficiency in populations based on adequacy of zinc in the national food supply (IZiNCG, 2004).

Total diet study (TDS) is a method specifically designed to establish, by chemical analysis, the dietary intake of food contaminants by a person consuming a typical diet; it can also be used to monitor and evaluate intakes of macro- and micro- nutrients in populations. Specifically, TDS can be based on market basket studies, individual food items, and duplicate portion studies. In a *market basket study*, food items that comprise part of the average diet of the selected age and sex group of interest are purchased from retail outlets in representative towns of the country, on one or more occasions per year (Gibson, 2005). Information derived from this approach is the average daily intake of contaminants/nutrients for each selected age and sex groups.

In *individual food item* approach, samples of most commonly consumed food items (usually obtained from national food consumption surveys) are collected, sometimes more than once a year, from major cities situated in certain geographic regions of the country (Gibson, 2005). Each of the food samples is then prepared table-ready prior to being analyzed. Individual food item approach enables identification of food sources of specific contaminants/nutrients.

For a *duplicate portion study*, a group of randomly selected individuals are selected and then each individual is asked (1) to collect a duplicate portion of all foods and beverages consumed over one or several consecutive 24-hour periods, and (2) to make written record of daily food intakes. Intakes of macro- and micro- nutrient intakes, as well as heavy metals, pesticides and contaminants, can then be calculated.

Universal product codes (UPCs) are standard multi-digit numbers with a machine-readable code that represents product, size, manufacturer and nature of the contents. With the use of electronic scanning devices UPCs can provide information on food purchases and expenditure at the local, regional and national levels. This method is

more applicable in developed countries or where most of the foods consumed by the population are packaged foods or fresh foods repackaged in food stores.

b. Food consumption at household level

The objective of measuring food consumption information at household level is to assess the total amount of food available for consumption in the household, generally excluding that eaten away from home unless taken from the home. This can be done using food account method, household food record method, household 24-h recall method.

In food account method, a householder (usually mother or one responsible for preparing food at home) makes daily record of all foods entering the household, either purchased, received as gifts, or produced for household use during a specified period, usually seven days.

While food account method assess foods *purchased* or *obtained,* in household food record method food actually eaten by the household is recorded, by householder or fieldworker, over at least 1-wk period. Using this method, the following information is recorded at each meal: weight or volume of family meal, detailed descriptions of the foods (e.g. brand names) and method of preparation.

In household 24-h recall method, household member responsible for the food preparation is interviewed to obtain on household composition and household food consumption (dishes, ingredients, quantity) over the previous 24-h period.

Using either household food record of household 24-h recall, besides total of foods consumed by the entire household, food intake of individual can be estimated using assignment factor. In order to calculate for per person food intake, total household intake is divided amongst the household members using weighting according to sex and age. Example of weighting are: '1' for males >14y, '0.9' for females >11y and boys 11-14y, '0.75' for children 7-10y, '0.40' for children 4-6y, and '0.15' for children <4y (Møller Jensen et al, 1984 In: Gibson, 2005).

c. Food consumption at individual level

There are two groups of methods used to measure food consumption of individuals and groups:

- The first is quantitative daily consumption methods, which consist of food records (estimated or weighed) and 24hour recall.
- The second groups of methods obtain retrospective information on the pattern of food use during a longer time period and consist of food frequency questionnaire and diet history.

- <u>Food Records (Estimated Food Records and Weighed Food Records)</u>

Principle and usage

a. Based on recording portion sizes of actual foods consumed by an individual, estimated using household measures or weighed using dietary scales. When weighing is used, the method is ideal for scientific and controlled studies in particular when diet counseling or correlations of intake with biological parameters are involved.

b. Used in research, multi-center epidemiological studies, for controlled metabolic studies. Nutrient intake data can form the basis of subsequent nutrition education programs.
c. If a weighed food record method is to be used, respondents must be motivated, numerate and illiterate, or alternatively a research assistant can collect the record their dietary intakes.
d. The number of 24-h recalls required to estimate the usual nutrient intake of individuals depends on day-to-day variation in food intake within one individual (i.e. within-subject variation. If more than one-day recall is required, nonconsecutive days should be selected.
e. Twenty-four-hour recalls can be repeated during different seasons of the year to estimate the average food intake of individuals over a longer time period (i.e. usual food intake).

Procedure

a. The respondent is asked to record, at the same time of consumption, all foods and beverages (including snacks) eaten in household measures, for a specified time period.
b. Detailed description of the food, including the following details:
    - name (local and general if known),
    - method of cooking,
    - state of food (e.g. raw, cooked, peeled, refined),
    - brand names where applicable,
    - all condiments, herbs, and spices,
    - complete description of each food.
c. Weigh the amounts consumed (portion served minus left over) or estimate using household measures and calibrated household utensils.
d. If occasional meals are eaten away from home, respondents are generally requested to record descriptions of the amounts of food eaten. The nutritionist can then buy and weigh a duplicate portion of each recorded food items, where possible, to assess the probable weight consumed.

The method to record mixed dishes for estimated and weighed food records:

a. Describe method of preparation and cooking.
b. Weigh edible portion of each raw ingredient or estimate using household measures to get the amount of each raw ingredient used in the recipe
c. Record the final weight (or volume) of the mixed dish (only for weighed food record)
d. Record weight (or volume) of portion size consumed or estimate using household measures and/or calibrated household utensils to get the amount of the food consumed by the subjects
e. Estimate the amount of individual ingredients consumed as the proportion of each ingredient that would be present in the amount eaten (weight ingredient in mixed dish / weight cooked mixed dish x weight of mixed dish eaten; or proportion of total volume of cooked mixed dish eaten x the weight of each ingredient in the mixed dish)

f. Adjust ingredient amounts for cooking yields and enter as the weight as a cooked ingredient weight (note nutrient lines should be for cooked ingredients because of nutrient losses with cooking).

Table 10.1. Comparison of the estimated food record and the weighed food record

Estimated Food Record	Weighed Food Record
Amounts of food and leftovers are measured in household measures or estimated using such measures as coffee cups, bowls, glasses and dippers. The researchers then quantify these measures by volume and weight	Food and leftovers are weighed using scales or computerized techniques supplied by researchers
Considered less accurate then Weighed Food Record	Most precise method available for estimating usual food and nutrient intake of individuals
Considered an acceptable method for collecting group intake of data	Preferred by some researchers for gathering data on individuals
Puts less burden on the respondent than Weighed Food Record and thus cooperation rates are likely to be higher, especially over long recording periods	Requires a greater degree of subjects cooperation than Estimated Food Record and thus likely have a greater impact on eating habits than Estimated Food Record
As effective in ranking subjects into thirds and fifths as weighed record	Cost of scales may be prohibitive in some instances
	Precision is greater than estimated food record because the portion sizes are weighed which reduces the contribution to variability from error

Usually, the subject, parent, or caretaker completes the food record, although in less developed countries a local field investigator may perform this task.

Table 10.2. Strengths and weaknesses of food record method

Strengths	Weaknesses
o Does not rely on memory. o Provides detailed data on portion sizes consumed, especially when weighed. o Said to be reasonably valid for up to 5 days. o Can assess food patterns and eating habit in relation to the socio-demographic environment of respondent. o Can enhance interpretation of laboratory, anthropometric and clinical data. o Multiple-day data more representative of usual intake	o Require high degree of subject cooperation. o Act of recording may alter habitual diet. o High respondent burden may result in low response rate. o Subjects must be literate to complete the records, or a research assistant will need to do it for them. o Time-consuming. o Analysis is labor-intensive and expensive. o Significant underreporting may still occur

- 24-Hour Recalls (Single and Repeated 24-Hour Recalls)

Principle and usage

a. Method assesses actual food intake of an individual during previous 24 hours period or preceding day.

b. The number of 24-h recalls required to estimate the usual nutrient intake of individuals depends on day-to-day variation in food intake within one individual (i.e. within-subject variation. If more than one-day recall is required, nonconsecutive days should be selected.
c. Nutrient intake data can form the basis of subsequent nutrition education programs.
d. Twenty-four-hour recalls can be repeated during different seasons of the year to estimate the average food intake of individuals over a longer time period (i.e. usual food intake).

Single 24-hr recalls (or, alternatively, single food record) can be used for large-scale field studies to characterize average intakes of population groups when the subjects are representative to the population and the assessment should be conducted such a way that all days of the week are equally represented. It is not sufficient to describe an individual's usual intake of food and nutrient; multiple 24-h recalls on the same individual over several days are required to achieve this objective (Gibson, 2005).

Repeated 24-hr recalls (or, alternatively, repeated food records) can be used to assess usual nutrient intakes for an individual. Repeated 24-hr recalls on a sub-group of the population can be used to assess prevalence of inadequate nutrient intakes within each sub-group.

Procedure:

a. Respondent recalls all foods and beverages eaten in the past 24 hrs.
b. Respondent describes in detail each food item consumed (i.e. raw/cooked; method of cooking etc.) starting from first thing in the morning and moving sequentially through the day ending with the last food items eaten at the end of the day.
c. Respondent estimates portion sizes consumed in common household measures using:
    - Graduated food models or graduated photographs
    - Actual samples of prepared staple foods
    - Calibrating utensils of respondent
d. Interviewer checks the recall with the respondent
e. Interviewer converts portion sizes consumed into gram equivalents

A four stage, multiple-pass interviewing technique is often used, using the following procedure:

a. First pass: A complete list of all foods and beverages consumed during the preceding day is obtained
b. Second pass: A detailed description of each food and beverages consumed, including cooking methods and brand names (if possible)
c. Third pass: Estimates of the amount of each food and beverage item consumed are obtained, generally in household measures and entered on the data sheet or computer-based data-entry form. Information on the ingredients of mixed dishes must also be collected at this time
d. Fourth pass: the recall is reviewed to ensure that all items, including use of vitamin and mineral supplements, have been recorded correctly

Interactive 24-h recall is the modification of 24-h recall to collect information on rural populations in developing countries. It allows investigator to:

- Train the respondent to estimate the portion size before the actual recall
- Supply picture chart on the day before the recall for use a checklist on the day the food is actually consumed and for comparison with the recall to reduce memory lapses
- Provide bowls and plates for use on the recall days to help the respondent visualized the amount of food consumed.
- It is also necessary to ask the respondents' bowl, plate, spoon, glass or any other eating utensils. Specific portion size from respondents' utensils indicating the actual food consumed by the respondent are then converted into weight equivalent

(Ferguson et al, 1995)

Table 10.3. Strengths and weaknesses of 24-h recall method

Strengths	Weaknesses
o Simple, easy and quick o Provides a qualitative description of the dietary pattern as well as nutrient intakes. o Useful for assessing average usual intakes of a large population, and are therefore often used for large dietary surveys (Gibson, 1998). o Can be used equally well with both literate and illiterate participants o Subjects require no training o Respondent burden low so response rate is usually high. o Non-threatening. o Element of surprise so less chance of altering diet. o Wide sampling coverage possible. o Relatively inexpensive o More objective than dietary history o Useful in clinical settings	o Relies on memory (subject may fail to recall all the foods eaten or may add foods not consumed). o Due its retrospective nature, the 24 hour recall is less suitable for use with children and the elderly. o Prone to errors in estimating portion sizes consumed (subject may under- or over-estimate amount). o May not reflect the usual intake of the group if recalls do not represent all days of the week (can not take account of day-to-day variation in an individuals' food consumption). o The interviewer must be well trained o Continuous questioning and answering is tiring for both the respondent and the interviewer and may result in errors. o Prone to errors when portion size estimates are converted to gram equivalents. o Prone to errors in coding food items if limited number of food items in database. o Omissions of dressings, sauces, and beverages can lead to low estimates of energy intakes. o Data entry can be very labor intensive

- Food Frequency Questionnaires (FFQ)

Most nutrition research is interested in the usual intake of the individual. Consequently, single 24-hour recalls are not appropriate. Multiple recalls are expensive and burdensome. Furthermore, all recall or recording methods that obtain information on current diet are completely inappropriate for case-control studies, in which it is necessary to ask about intake some time in the past, at least before symptoms of the disease were noticed.

Principle and usage

a. The Food Frequency Questionnaire (FFQ) assesses energy and/or nutrient intakes by determining how frequently a person consumes a limited number of foods that are major sources of nutrients or of a particular dietary components in question per day (week or month) during a specified time period (typically 6 months to 1 year)
b. Provide data on habitual intakes of selected nutrients, certain foods or food groups
c. Specific combination of food can be used as predictors for intakes of certain nutrients or non-nutrients, provided that the dietary intake components are concentrated in a relatively small number of foods or specific food groups, e.g. consumption of vitamin C are predicted from fresh fruits and fruit juice.
d. FFQ are often designed to gain information about specific aspects of diet, such as dietary fats or particular vitamins or minerals, and other aspects may be less well characterized
e. The questionnaire consists of a list of approximately 100 or fewer individual foods or food groups that are important contributors to the population's intake of energy or other specific nutrients of interest
f. Should feature simple, well-defined food and food categories, and open-ended questions should be avoided as preformatted lists of food categories act as a memory prompt
g. FFQ are usually self-administered and are therefore designed to be easy to complete by the study subjects (interviewed by interviewer or filling in the computerized questionnaire or by telephone)
h. FFQ often rely on assumptions regarding portion size, and are limited by the amount of detail that it is feasible to include in the questionnaire
i. It is possible for the questionnaires to be semi-quantitative where subjects are asked to estimate usual portion sizes
j. In epidemiology, FFQ are often filled in with reference to the previous year in order to ascertain usual food consumption patterns for that period**.**
k. The FFQ must be culture specific (Khonson, 2002)

There are two types of FFQ:

a. Qualitative FFQ consists of:
    - List of foods: specific (focus on specific groups of foods, particular foods, or foods consumed periodically in association with special events or seasons) or extensive (to enable estimates of total food intake and dietary diversity to be made)
    - Frequency-of-use response categories: daily, weekly, monthly, yearly

b. Semi-quantitative FFQ (SQ-FFQ) is a qualitative FFQ with the addition of portion size estimates as: standard or small, medium, large. This modification allows the derivation of energy and selected nutrient intakes.

Qualitative food frequency

Uses of the method:
a. Classifying usual dietary patterns
b. Explore the possibility correlations of retrospective long term food intakes/food habits with chronic diseases/health (Willet, 1994; Levi et al, 2000; Kesse et al, 2001).
c. Assessing nutrition education programs
d. Assessing dietary compliance of individuals or groups
e. Identifying people who may need more detailed dietary assessment
f. Establishing trends in food purchases
g. FFQ data are commonly judged to be appropriate for the discrimination of study participants according to their habitual food or nutrient intake
h. Ranking individuals into broad categories, e.g. high, moderate and low intake

CAUTION
The ability of a FFQ to measure quantities of consumed foods and nutrients still is a matter of discussion, but most investigators agree that the assessed levels of intake are rather *approximations* than accurate measurements.

Procedure of Qualitative FFQ
a. From a list of particular foods/food groups of interest, ask the respondent to identify how often they usually consume each food item (food group) (lists of food categories act as a memory prompt)
b. Five categories for the food frequency of food are available: daily (D), weekly (W), monthly (M), yearly (Y), rarely/never (N). The respondent selects the most appropriate category for the frequency of consumption of each of the food item chosen, and record the number of times each food item is consumed in the appropriate box
c. In a simple or non-quantitative FFQ, a choice of portion size is not given. These generally use "standard" portion sizes drawn from large-population data.

Table 10.4. Example of qualitative FFQ format

Food item	**Frequency**				
	Daily	**Weekly**	**Monthly**	**Yearly**	**Never**
Tempe					
Tofu					
Soybean					

Semi-quantitative food frequency

Semi-quantitative food frequency questionnaire (SQ-FFQ) is used to rank individuals according to food or nutrient intake, thus often specifies a standard reference portion size for each specific food.

The data derived from SQ-FFQ can be converted to data on energy and nutrient intakes by multiplying the fractional portion size of each food consumed per day by its energy and nutrient content, obtained from the appropriate food composition data. The results are then summed to obtain an estimate of an individual's total daily intake or to represent the median amount consumed during a single meal (Gibson, 2005).

The questionnaire must contain enough foods that are good sources of the nutrient of interest in order to discriminate between low and high consumers. The FFQ can examine current diet or diet in the recent or remote past.

CAUTION

The FFQ should feature simple, well-defined foods and food categories, and *open-ended questions should be avoided* as preformatted lists of food categories act as a memory prompt.

Procedure of semi-quantitative FFQ

a. Complete the three-steps of non-quantitative FFQ procedure
b. A choice of three portion sizes is available: small (S), medium (M), and large (L). Indicate the usual portion size consumed for each food item in the appropriate box.
c. Convert all the frequency-of-use categories to a daily basis with once per day equal to one. For estimates reported per month, assume there are 30 days per month. For example:
    - rice consumed 3 times per day is equivalent to 3;
    - *tofu/tahu* consumed 4 times per week is equivalent to 4/7 per day ≈ 0.57 per day;
    - ice cream consumed five times per month is equivalent to 5/30 ≈ 0.17 per day.
    - For seasonal fruits and vegetables use the yearly category. For example, mango consumed ten times over October to December is equivalent to 10/365 per day ≈ 0.03 per day
d. Multiply frequency per day by the selected portion size (in grams) to provide weight consumed in grams per day.

Table 10.5. Example of semi-quantitative FFQ format

Food item	**Medium Serving (HH unit)**	**Frequency (D=daily, W=weekly, M=monthly, Y=yearly, N=never)**					**Portion (S=small, M=medium, L=large)**			**Average frequency per day***	**Average gram per day***
		D	**W**	**M**	**Y**	**N**	**S**	**M**	**L**		
Tempe	1pc=50gr										
Tofu	1pc = 100gr										
Soybean	2½tsp = 25gr										

* Can be later calculated using available softwares, e.g. Nutrisurvey

How to obtain list of food

Food group

Conduct a 24-h recall (one 24-h recall for each subject). In Negev Nutrition study, number of the subject was 377 community dwelling participants ≥65 y old (that

randomly selected from the Negev to be included in the study using proportionate geographic cluster sampling. Total sample for Negev study was 1173 subjects ≥ 35 y old)

For estimating intake of a specific nutrient, the results of the survey were used to develop the FFQ using the following steps:

a. Search/find list of food in food composition table for food item rich of specific nutrients. Ideally, this should be done on a portion size basis
b. List all those food rich in specific nutrients of interest
c. Conduct once or a series of FGD (Focus group discussion) in particular community to identify available food sources and those commonly consumed in relation to food sources rich in specific nutrients of interest
d. Use the list developed from food composition table as the basis/guideline of the FGD. Foods never or not commonly consumed (e.g. consumed by <10% of the subjects) are excluded from the list.
e. Foods remaining after step #4 are pilot tested before the final food list is developed (Final FFQ)

(**Source**: Shahar et al, 2003).

CAUTION

Very long food lists will tend to overestimate the intake, while short lists will tend to underestimate the intake. Necessary limitations of FFQ size prevent including all food items contributing to the intake of target nutrients.

How to obtain portion sizes used as a standard portion size in semi FFQ

1. Available sources:
    a. USDA Foods Commonly Eaten by Individuals
        - Medium portion size use the *median* portion consumed per eating occasion
        - Small and large portion sizes were based on the *25th and the 75th percentile*
    b. Nutrition Canada Food Consumption Portion Data
        - Medium portion size use the *mean* portion consumed
        - Small and large portion sizes were based on the ± *1 SD*

2. Portion size calculated from the survey
    a. Each food item (data gathered from 24-h recall - once 24-h recall for each subject), were than sum to obtain total amount reported
    b. Calculate the *mean portion size* for each item. Total amount reported divided by the number of persons reporting the item.
        - For example 11,047 g of mixed beef dishes were eaten by 55 people, thus resulted in a portion of 146g/person
    c. Mean portion size for each food item could be used as the medium portion size

Table 10.6. Strengths and weaknesses of FFQ method

Strengths	Weaknesses
o Easy to collect, simple and cheap. o Quick (between 20 minutes (for the Block Brief 2000) to as much as 1-1/2 hours) o Low respondent burden compared to recording methods. o Sometimes can be self-administered (machine readable printed questionnaire or a computer-administered questionnaire) or by telephone. o Simple data processing. o High response rate and thus can be used with large samples at the population level. o The relative ease of administration and affordability makes FFQs appropriate for use in large scale studies and they are frequently used in cohort studies o Can represent *usual* intake of specific foods/food groups and nutrients over an extended period of time.	o Results depend on the completeness of the food list in the questionnaire. o Seasonal foods difficult to quantify. o Relies on memory o Portion sizes given in a semi-quantitative FFQ may not reflect those eaten by the subject. o Difficult to relate result to those obtained using other dietary methodologies-overestimates intakes. o Only suitable for certain nutrients-cannot be used for all nutrients. o Validity and feasibility of the FFQ for estimating food intakes in the remote past has not been clearly established (van Staveren et al., 1986; Dwyer and Foleman, 1997; Ambrosini et al., 2003) o Accuracy of measurement of absolute intakes is lower than for other methods (Gibson, 1998). FFQ is conceptually more abstract than more concrete methods such as the 24 hour recall or food record because the respondents must think of "usual" frequency; hence it is more difficult to complete accurately.

Considerations for developing a Food Frequency questionnaire (Fehily and Johns, 2004):

- Self-administered or administered (by an interviewer) questionnaire
- Computerized or paper form.
- Location of questionnaire completion. This might affect the amount of time available to complete the questionnaire.
- Open or closed format of questions. For example, 'how often do you eat bread?' with a free text response, or 'How many slices of bread do you eat per day?' with frequency options to select.
- Sequence and wording of questions. Questions should be unambiguous and it is important to start a questionnaire with a simple question
- Data coding for analysis, i.e. how answers will be converted into numerical values
- Range and compatibility checks on data. Rules need to be developed so that unlikely and contradictory data can be identified.

- **Dietary History**

Principle and usage

Used to assess an individual's usual dietary intake over a retrospective time period (e.g., past month or year)

Procedure

The most commonly used method is that used by Burke (1947). Other modified version of diet history used for SENECA, Survey in Europe on Nutrition in the Elderly: A Concerted Action (Euronut-SENECA, 1991). The method includes:

- Burke (1947):
  a. Collect general information about respondent's overall health and eating patterns, including: number of meals eaten per day, appetite, food dislikes, presence/absence of nausea and vomiting, use of supplements, cigarette smoking, habits related to sleep, rest, work, exercise, etc
  b. Conduct a 24-hr recall of actual intake
  c. Perform a cross-check by questioning frequency of consumption of specific food items mentioned in step 2
  d. Ask the respondent to complete a 3-day weighed or estimated food record
- SENECA (1991):
  a. Complete 3-d estimated record of the respondent
  b. Interview respondent on their dietary intake over the past month
  c. Weigh portions of the most commonly eaten foods
- Other (van Staveren et al, 1985) used a three-part dietary history covering 1 month to record usual food consumption on weekdays, Saturday and Sunday using weighed diet record. Daily average intake was then calculated using the following formula: (5 x weekday) + Saturday + Sunday.

Table 10.7. Strengths and weaknesses of dietary history method

Strengths	Weaknesses
○ assesses usual nutrient intake (can be more representative of habitual intake than 7-d weighed records) ○ can detect seasonal changes ○ data on all nutrients can be obtained ○ can correlate well with biochemical measures	○ lengthy interview process (up to 2 hour) ○ requires highly trained interviewers ○ difficult and expensive to code ○ may tend to overestimate nutrient intake ○ requires cooperative respondent with ability to recall usual diet

d. Choice of methods to assess food intakes of individuals/groups

Before deciding on what method(s) to choose, it is important that we are clear with our objective of doing dietary assessment. There are four levels of objectives in dietary assessment: Level 1 and Level 2 refer to nutrient intake data at group level, whereas Level 3 and Level 4 will provide sufficient information and interpretation at individual level.

- Level 1: Mean intake of a group
  - Measure food intake of each subject for one day only
  - Ensure all days of the week are proportionately represented in final sample
- Level 2: Proportion "at risk" to inadequate intakes
  - Measure food intake for at least two days on sub-sample (30-40 subjects)
  - Non-consecutive days should be used when using two repeats. If non-consecutive days not possible, then three consecutive days are needed

- Level 3: Rank intakes of subjects within the distribution
  - Multiple replicates of 24-hour recalls/diet records/diet history
  - Alternatively, semi-quantitative FFQ can be used
- Level 4: Usual intakes for correlations or counseling
  - Larger number of replicates required
  - Alternatively, semi-quantitative FFQ or diet history can be used

NOTE:
For Level 3 and Level 4, the number of replicates depends on the objective (whether ranking or correlation is used) and on the within-subject variation. As rule of thumb, the higher the within-subject variation relative to the between subject variation (such as for nutrient with relatively few sources, e.g. calcium) the more replicates will be needed.

In addition to meeting the objectives, choice of dietary assessment methods should also consider characteristics of the target group (age, degree of literacy, etc.), respondent burden and availability of equipment and resources Figure 10.1 provides summarized "pointers" connecting the different levels of objectives and available dietary methods including the important consideration. Table 10.8 gives more detailed examples of objectives for each of those 4 levels.

Table 10.8. Examples of objectives in dietary assessment studies

Level	Study objectives
1	○ to describe usual mean nutrient intake for a group with certain precision ○ to demonstrate a significant difference in mean or median intakes between two groups ○ to demonstrate a significant change in group mean intakes, based on *paired* measurements e.g. before and after intervention ○ to demonstrate a significant change in group mean intakes, based on *un-paired* measurements
2	○ to determine distribution of intakes within group to assess proportion at risk of inadequate intakes ○ to determine a significant change in proportion at risk of inadequate intakes before and after intervention ○ to determine a significant change in proportion at risk of inadequate intakes between groups ○ to assess the risk of inadequate intakes of a nutrient in specific sub-groups defined by sex, SES, etc
3	○ to assess the relationship between frequency of food groups (e.g. deciles of green leafy vegetables) versus mean level of biomarker ○ to divide subjects into terciles of nutrient intakes and calculate the corresponding average biomarker level for each tercile
4	○ to assess inter-relationship between nutrient intakes of individuals to other indices of nutritional status measured in the same persons

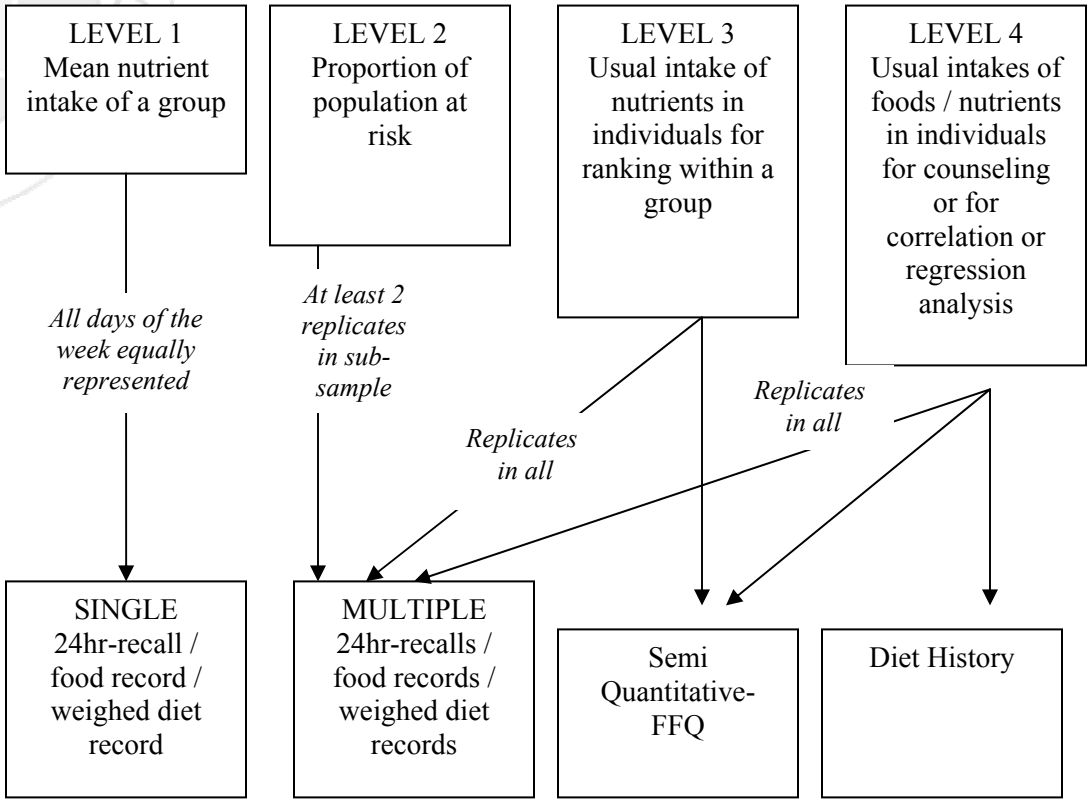


Figure 10.1. The four levels of objectives in measuring nutrient intakes and methods which can be used to meet the objectives

e. Additional methods to obtain dietary information

Visit to local markets **('market survey')** and food sellers can provide important information on local food availability, food price, local units and food choice of the people. **Observation** of local people's behavior during food preparation and food consumption can also provide information regarding intra-household food distribution, gender difference in food intake (if any), food-related behaviors (foodways, food patterns, food consumption cycle) –the latter is described in the following sub-chapter. The following considerations can be used to guide the observations:

- health impact of the behavior
- positive consequences of the behavior
- cost of engaging in the behaviors
- compatibility with existing practices
- complexity of the behavior
- frequency of behavior
- persistence
- observability

Focus group discussion is another approach that can be done in order to obtain this information, especially information that may not be easily observed during limited time period of study (e.g. food preferences, food taboo, and food belief).

(t)

Figure 10.2. Focus Group Discussion among mothers to obtain information on the recipe and usual portion size of complementary feeding.

10.3. Culture-related Issues and Other Issues to be Considered When Conducting Dietary Assessment

a. Food consumption cycles

Many dietary data collection methods are based on time periods which are appropriate in Western culture, but may be less or not applicable in other cultures. For instance, standard food frequency questionnaire (FFQ) aimed at capturing food pattern and frequency is usually based on intake of previous month (or 2-3months) or of previous week. In community where food availability is determined by seasonal changes, use of a single FFQ without consideration of the time when it is conducted (food shortage or food plenty) will result in food intake information which can be either under- or over-estimated of the true condition. As another example, questions directed to obtain daily food pattern usually refers interviewers asking about intakes during standard meals consisting of three meals (breakfast, lunch, and dinner) with snacks in between. This may be not suitable in culture where people eat two main meals everyday such as in some agriculture community (i.e. main meal is set at sometime between normal breakfast and lunch, and dinner).

To better assess the "usual" intake, different parts of the food consumption cycles must be proportionately included in the dietary assessment instrument, and this is best done by gathering information prior to instrument development on things that affect food cycles in that particular community. This may include information on scheduling of market days, wild plants ripening, regulation of availability of particular food (seasonal effect), agriculture calendar (i.e. planting, harvest), food security pattern (food shortage, food plenty), feasting, fasting, and other things that affect food consumption cycle.

b. Dietary structure: food patterns, food ways and food status

Dietary structure is important issue to be familiar with prior to conduct of dietary assessment. This includes information on food pattern, food ways and food status. *Food pattern* is information regarding what constitute meal items (staples, cereals, grains, tubers), relishes i.e. foods eaten together with staples, condiments (salt, spices), and snack foods.

Information about the style of food consumption is included as well in food pattern. It should be considered in choosing and preparing instrument for dietary assessment. The food serving technique i.e. whether foods are served in common bowl for the whole family or served in individual bowl for each family member has affect on choice of dietary assessment methods. When communal eating is common, it is difficult to assess individual dietary assessment. In a study in Kalama, Egypt (Jerome, 1997), where communal eating is the norm, quantitative consumption data on the group and qualitative consumption data from evaluations of cultural norms identified through ethnographic research are used. However, If collection of quantitative data on individual food intake is necessary (e.g. for studies aimed to determine association between food/nutrient intakes with individual health outcomes), ethnographic findings should inform the researcher regarding appropriate strategies for obtaining the required information. For instance, in Egypt, the female household head, assisted by other women in the household, can provide quantitative data on individuals. This woman has the principal responsibility for food procurement, preparation, and presentation and plays a hostess-type role during family meals (Jerome, 1997). When specific member of the family is the main focus of the study, such as the underfive child, it is also possible – with the permission of the other household members—to allow this child to start eating first and thus quantitative intake can be determined by weighing of the foods before and after the child eats.

Mixed dish or combination of ingredient foods also complicates dietary assessment in terms of quantifying each individual ingredients for further nutrient intake analysis. When mixed dishes composition is quite uniform the easiest way is to obtain recipe of the mixed dishes and incorporate the recipe in the food composition database. When, on the other hand, the recipe is varied from household to another (such as for complementary foods), the mother or person responsible for mixed-dish preparation can be interviewed –or best observed and weighed during cooking—in order to obtain the recipe. Accuracy of quantifying mixed-dishes indeed can be increased by direct observation on household food preparation techniques ("cooking session").

In some cultures, it is common that there is unequal share of important ingredient (~nutrient) in mixed dishes amongst the family members. In this situation it is best to quantify each individual ingredient in the dietary questionnaire rather than to assume standard mixed-dish recipe.

Food eaten away from home is also an issue which has to be considered when preparing strategy for obtaining dietary intake data. In study of under-five year old children who already started to buy foods from food vendors, or eat foods prepared at home while playing, enumerators follow the child during the day and bring the portable food weighing so anytime child ate the food can be weighed (Santika et al, 2009). This of course requires that enumerator builds a good rapport with mother and child so that subject is not annoyed during dietary data collection.

Foodways is important to refill the information about food procurement which can be derived from own production, giving from other sources or purchasing. This information is also needed to identify food distribution and consumption pattern within household, therefore we can identify who will be the proper respondent for certain dietary assessment, i.e. mother for surrogate respondent if doing dietary assessment for children.

Some basic household level variables should also be considered in collecting dietary intake data. This may include information regarding economic resources (SES), education or literacy level, household composition, ethnicity (cultural group), social articulation (level of contact with outside world, societies), women's task allocation, kinship networks (household types), religious affiliation, political participation, recreational patterns, migration patterns, or other variables affecting food intake in the particular community of the study.

c. Research design

When food frequency questionnaire is the chosen method to obtain the usual intakes, pre-study to document foods in which nutrients of greatest interest are most commonly consumed is required. This is not only important when the FFQ is self-developed, but also relevant when standard FFQ is used so that necessary adaptation can be made.

The dietary assessment method selected must fit into the research design and be tailored to the constraints of the field situation. Based on these two criteria then a certain dietary method can be chosen (as it is or modified) or a new instrument must be developed (e.g. FFQ which is specific for certain culture). When modified or newly-developed instrument is needed, ethnographic research can be of help.

Ethnographic methods help to understand the nature of variation in human food consumption and thus can be integrated at the beginning of dietary research, to provide information on the followings:

- food acquisition, storage, exchange, processing, preparation
- food distribution and consumption pattern within household
- instruments used by a community to quantify individual food/beverages
- foods acquired through production, purchase, or gifts
- foods stored for long/short period
- foods exchanged or distributed as gifts
- foods processed or prepared daily, monthly, seasonally, or as needed for local or festival calendar
- foods served in the household
- foods discarded as waste

10.4. Example of the Application of Culture-Sensitive Dietary Assessment

Cultural differences have important influence on dietary assessment especially on instrument used to obtain the usual intake such as FFQ. According to Teufel (1997) there are four terms which describe the extent to which culture has been accommodated into dietary assessment instrument and approach:

- cultural awareness
- cultural sensitivity
- cultural appropriateness
- cultural competence

Cultural awareness exists when there is recognition of culturally unique behaviors (a cognitive domain). For example, an FFQ asking "Is there other foods you eat at least once a week, and if yes what?" is an example of a culturally-aware instrument.
Cultural sensitivity exists when there is recognition and accommodation of culturally unique behaviors (cognitive and affective domains) and is a step higher than cultural awareness. An FFQ asking or adding "other or traditional foods" at the end of form is example of culturally-sensitive instrument.
At higher level is *cultural appropriateness* which implies inoffensive quality and potential utility. FFQ inserting blank lines at the end of each food group for recording culture-specific foods has potential utility for recording culture-specific foods only for respondents who know the characteristics of the food groups and the intent of the FFQ. Nevertheless, under cultural awareness, cultural sensitivity and cultural appropriateness food consumption is still reported according to culturally unfamiliar categories and may lead to miscommunication, inaccurate reporting and frustration.
The most ideal situation is when *cultural competency* is achieved which implies not only understanding of the conceptual universe of the culture but also an ability to use that understanding to work successfully within that context. This requires mastery of cultural knowledge, perspectives and behavior.

Steps in Developing Culturally-competent FFQ

1. Development of culture-specific food list
2. Determination of culture-specific food groups
3. Creation of culture-specific database
4. Definition of culturally appropriate serving sizes
5. Comprehensive assessment of the FFQ
6. Validation and reliability testing of FFQ

Source: Teufel NI., l997.

Summary

Dietary assessment can be done at national, household and individual levels. At the group/community and individual level, dietary assessment can be chosen based on whether actual or usual intake information is required, whether several or single nutrient is of interest, the purpose of analysis and the level of conclusion made (group or individual). Method selected must be appropriate for the study objective.
Food consumption pattern and foodways need to be accommodated when designing dietary assessment in a specific population. This can be done among others by the help of ethnographic study.
Recognition of culture in dietary assessment is increasingly reflected, respectively, under cultural awareness, cultural sensitivity, cultural appropriateness and cultural competence. As much as possible, cultural competence should be the target in order that the instrument represent the true situation and work successfully in the context of particular culture.

Learning Activity 10.1.

In rural Pangalengan, where majority of households are poor, market is held for one week in one village before moving to the other three villages the following weeks. Some areas are fishing area and others rely more on plantation of cash crops. The nutritional status of underfive children is disheartening. Most of the mothers do not know how to give an appropriate complementary feeding to their young children. There fore, please identify the complementary feeding in this population in order to develop further message(s) to improve the complementary feeding.

Tasks:

a. Discuss factors determining their diet, i.e. what variables/information should be collected in order to identify the determinants of diet.
b. Based on above finding, discuss how they may affect the dietary assessment
c. What dietary assessment method should be selected and what "approach" should be incorporated?
d. What other food information is necessary to be collected?

References:

Fehily AM and Johns AP. Designing questionnaires for nutrition research. Nutr Bull. 2004; 29(1):50-6.

Ferguson EL, Gadowsky SL, Huddle J-M, Cullinan TR and Gibson RS. An interactive 24-h recall technique for assessing the adequacy of trace mineral intakes of rural Malawian women: its advantages and limitation. Eur J Clin Nutr 1995; 49: 565-78

Gibson RS and Ferguson EL. Assessment of dietary zinc in a population. Am J Clin Nutr (suppl) 1998; 68: 430S-34S.

Gibson RS. 2005. Principles of Nutrition Assessment 2nd ed. Oxford University Press. New York, 2005.

Jerome NW. Culture-specific strategies for capturing local dietary intake patterns. Am J Clin Nutr 1997; 65(suppl): 1166S-7S

Khonson RK. Dietary intake-How do we measure what people are really eating? Obesity Research 2002; 10;63S-68S.

Messer E. Methods for studying determinants of food intake. In Pelto GH, Pelto PJ, Messer E (eds) Research methods in nutritional anthropology. Japan: United Nations Press, 1989. page 1-33.

Møller Jensen O, Wahrendorf J, Rosengvits A and Geser A. The reliability of questionnaire-derived historical dietary information and temporal stability of food habits in individuals. Am J Epidemiol 1984; 120: 281-90.

Quant SA, Methods for determining dietary intake. In Johnston FR (eds). Nutritional Anthropology. New York: Alan R. Liss, Inc, 1987. page 67-84

Santika O, Fahmida U, Ferguson EL. Development of food-based complementary feeding recommendations for 9- to 11-month-old peri-urban Indonesian infants using linear programming. J Nutr 2009; 139: 135-141.

Teufel NI. Development of culturally competent Food-Frequency Questionnaires. Am J Clin Nutr l997; 65(suppl): 1173S-8S

Willet W. Nutritional epidemiology, 2nd ed. Oxford University Press. London, 1998.

PART 3

METHODS IN THE FIELD OF NUTRITIONAL ANTHROPOLOGICAL STUDIES

CHAPTER 11

Qualitative Research: Methods in Nutritional Anthropology

Airin Roshita, Judhiastuty Februhartanty, and Andi Mariyasari Septiari

Objectives:

1. To explain research methods used in studies of nutritional anthropology.
2. To discuss the practical issues for conducting nutrition anthropology research in the field, including ethical issues and common methods used for data gathering.

> *"Cultural anthropologists, or ethnographers, collect data about how people in diverse cultures live, as often as possible in the words of our subjects, tape-recorded and transcribed.*
> *We gather data by living with people, observing their lives, and asking them questions about what they do and what it means to them.*
> *Cultural anthropologists then try to make sense out of, or interpret, the data they gather about human behavior. Here, analysis and philosophy enter. In data analysis, we explore the connections and conflicts in people's diverse ways of behaving and relate them to other things we know about the culture and about human behavior in general.*
> *Then we philosophize – we seek ways of explaining the data by looking at ideas of other social scientists and ultimately coming up with our own interpretation.*
> *Finally, comes the writing, the communication of our ideas to others."*
>
> **Source:** Carole M. Counihan 1999

11.1. Introduction

Throughout the course we have seen the many contributions of social sciences to the development of health sciences over the years. As health problems are increasing associated with human behavior, it is critical to understand why certain programs succeed and others fail, why certain people decided to consume balance meals and others did not and what needs to be done to improve health programming (Ulin, 2005; Green and Thorogood, 2004).

Health professionals are turning to social research to help answer those questions and improve health programs and service delivery. Social science disciplines such as sociology (study of human society), social anthropology (study of people in the context of culture and society) and history (especially history of medicine and medical

knowledge) have played an increasingly important role in understanding health problems at the individual and population level (Green and Thorogood, 2004).

11.2. What is Qualitative Research?

Qualitative research focuses on obtaining an in-depth understanding of the context of a particular problem. Unlike quantitative research which relies on large sample sizes, numerical and statistical assessments, qualitative research uses data in the form of words and images. Silverman (2000) explains that qualitative research is a natural and inductive type of study as it is allows hypothesis generating rather than hypothesis testing. He also argues that qualitative research provides a deeper understanding of social phenomenon which statistics can not measure. It is used to understand the people's behavior in every day life (Marshall and Rossman, 1996) and to study social reality such as people's lives, life experiences, emotions, feelings, social movement, cultural phenomenon and interaction between nations (Silverman, 2000; Strauss and Corbin, 1998).

Table 11.1. Examples of health research.

Title of paper	Methods of data collection	Aims
Guinea worm: an in-depth study of what happens to mothers, families and communities (Watt et al, 1989)	In-depth interviews, observation	Exploring the processes associated with incapacity due to guinea worm and its impact on the community
Cancer patients' information needs and help-seeking behavior (Leydon et al, 2000)	In-depth interviews	To explore why cancer patients do not want or seek information about their condition other than that supplied by physicians
Doctor in the house (Hardey, 1999)	Household interviews	(To examine) the internet as a source of knowledge about health in relation to the broader sociological debates about de professionalization and consumerism
Leprosy among the Limba (Opala and Boillot, 1995)	In-depth interviews	Examines Limba concepts of leprosy within wider context of Limba world view
Parents' perspectives on the MMR immunization (Evans et al, 2001)	Focus group interviews	To investigate what influences parents' decision on whether to accept or refuse (measles, mumps and rubella) immunization

Source: Green and Thorogood, 2004.

As much of the literature explains the differences in qualitative and quantitative studies lie in the type of data (qualitative is primarily text based and quantitative is primarily numerical) and the methods of data collection. Green and Thorogood (2004) argue the differences in those two dimensions are not crucial as qualitative may also have numbers and quantitative may result in words and both qualitative and quantitative studies may share the same methods of data collection (such as interview

and observation). The differences according to them lie in the aim of the study as qualitative studies are designed to seek answers to questions about "the *what*, *how* or *why* of a phenomenon, rather than questions about *how many* or *how much*" (Green and Thorogood, 2004:5).

Similar explanations are provided by by Ulin, Robinson and Tolley (2005) who state that researcher go further by using qualitative research to answer questions of *whys* and *hows* after they have answered in terms of *how much* and *how many*. The choice of doing qualitative or quantitative methods thus depends on what we want to find out and the nature of the research problem (Silverman, 2000; Straus and Corbin, 1998). Table 11.1 annotates examples of health research and their aims.

The differences in characteristics in the two methods are not to compare which one is the better, rather how they complement each other. Quantitative research using representative samples can produce reliable outcomes to be generalized to a wider population, but it lack of contextual detail. On the other hand, qualitative studies can describe the rich context of the study phenomena, but its generalization is limited (Ulin, Robinson and Tolley, 2005).

Breadth Versus Depth

In some ways, the differences between quantitative and qualitative methods involve trade-off between breadth and depth. Qualitative methods permit inquiry into selected issues in great depth with careful attention to detail, context and nuance; that data collection need not be constrained by predetermined analytical categories contributes to the potential breadth of qualitative inquiry. Quantitative instruments, on the other hand, ask standardized question that limit responses to predetermined categories (lees breadth and depth). This has the advantage of making it possible to measure the reactions of many respondents to a limited set of questions, thus facilitating comparision and statistical aggregation of the data. By contrast, qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases.

Source: Patton MQ, 2002

11.3. How to Conduct Qualitative Research?

Many experienced qualitative researchers know that the process of qualitative research rarely follows the initial research plan. In fact, an iterative examination of the data during the course of the study is a normal part of the qualitative investigation. Changes to the research focus based on the examination of emerging data can help more quickly identify the key issues under investigation. However, the steps of conducting qualitative research are no different than any other type of research, in which rigor and quality are pursued. Designing a qualitative research as it is in quantitative one, involves formulating and refining a research questions, deciding what kind of study it will be, how data will be gathered and analyzed (Green and Thorogood, 2004).

Furthermore, whether it is a large funded project or small unfunded student research, researchers need to develop a research protocol or proposal in which the key elements of the research are outlined and the study protocol is able to show that the

study is feasible and the findings are useful. Creswell (2007) argues that the purposes, questions and methods of research are all interrelated. Ulin, Robinson and Tolley (2005) listed several questions important for designing a qualitative research as below:

a. What is the area and purpose of the research?
b. How is the research problem defined and the conceptual framework developed? What questions will address the research problem?
c. What methods will best address the research questions and how should data be collected?

Each one is discussed in turn.

Nasirudin Story

Nasirudin, the great Sufi mystic, appears in different guises in different stories. In one story, he is an acknowledged smuggler. Every evening when Nasirudin arrives at the customs house, the inspectors feverishly search the contents of his donkey baskets to discover what he is smuggling. But, each day their efforts go unrewarded. No matter thoroughly they inspect, they find nothing but straw.

The years go by and Nasirudin grows richer and richer. The customs officials vainly continue their daily search, more out of habit than hope of actually discovering the source of his wealth.

Finally, Nasirudin, now an old man, retires from his smuggling trade. One day he happens to meet the customs chief, who has now retired as well. "Tell me, Nasirudin," pleads his former adversary, "….now that you have nothing to hide, and me, nothing to find, what was it that you were smuggling all those years?"

Nasirudin looks the customs chief in the eye, shrugs his shoulders, and replies, "Donkeys, of course!"

Source: www.positivedeviance.org

a. Research area and the purpose of the research

A research area may be determined based on personal interest, experience or even request from a donor. A research area in nutritional anthropology can be for instance understanding the high incidence of food taboos in an area or looking at the contribution of a specific culture on child feeding which influences child nutritional status. A research area is linked with the study purposes which may be guided by existing literature on the topic (Ulin, Robinson and Tolley, 2005). Researchers need to think ahead of how the research finding will be useful and applied.

b. Research problem, conceptual framework and formulating research questions

In defining a research problem, researchers narrow the research area into a specific issue that will form the core of the study. It may come from findings of previous research, in which researchers finds a gap in scientific knowledge. Referring to previous research helps to put the research in the context of what has been found by previous quantitative research and what questions are left unanswered by other qualitative research.

Developing a conceptual framework helps researchers to focus on the research problem. According to Ulin, Robinson and Tolley (2005) a conceptual framework is "a set of related ideas behind the research design" which is developed in a systematic

diagram to show their possible relationships and associations. The development of a conceptual framework may be guided by literature review which shows the current findings and possible ways of conceptualizing the current problems.

A qualitative approach is appropriate if researchers want to understand the perspective of participants and the meanings they give to phenomena (Green and Thorogood, 2004), rather than questions of 'how many' or 'what proportion'. In formulating research questions, one needs to break up the broad questions into several specific and researchable ones. For instance the question about food taboos can be broken up into:

-What kind of food taboos exists in the area?
-Why people avoid certain types of food?
-What kind of people avoids certain foods?

Later during data collection process, further questions may arise which offer more ways to understand about the nature of food taboo in the study area and eventually lead to more relevant and useful conclusions (Ulin, Robinson and Tolley, 2005).

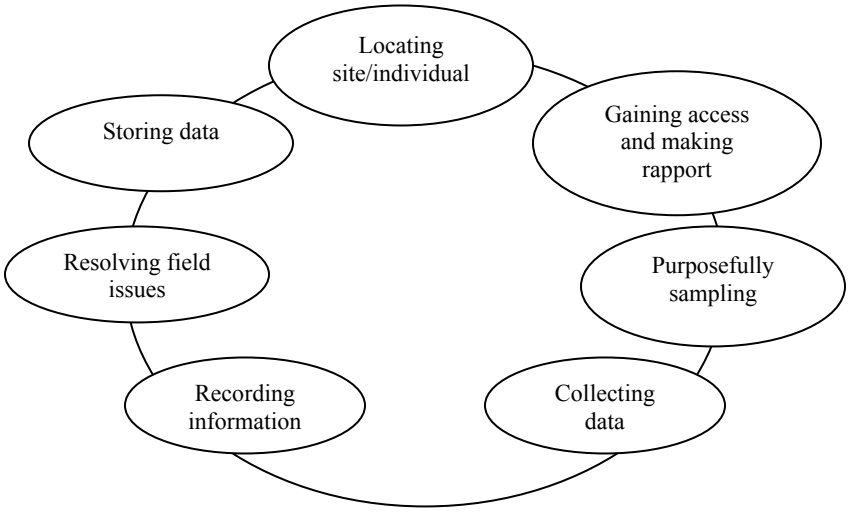


Figure 11.1. Data collection activities
(**Source:** Creswell, 2007)

c. Methods of data collections

Three primary methods of data collection in qualitative research include the interview, observation and group discussion, however Creswell (2007) argues that data collection goes beyond merely interviewing or observing but it involves an iterative process of related activities aiming at gathering good information to answer the research questions.

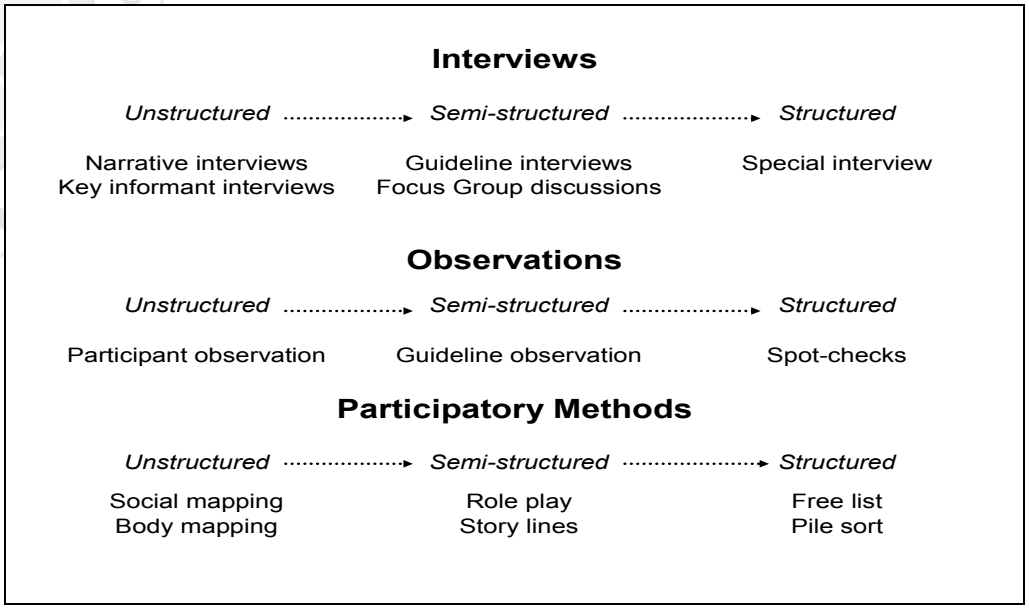


Figure 11.2. Overview of qualitative methods

An important step in the process of data collection is finding the study site, study participants, gaining access to these places and people, and building good rapport with them**.** Identifying a purposeful sampling is a related process in which the researchers determine a strategy to sample a group of people who can best inform researchers about the questions under investigation. It is not a sampling strategy derived from statistical inferences to represent a population, rather identifying certain characteristics of informants to be involved in the study (Ulin, Robinson and Tolley, 2005).

There are no rules of thumbs for sample size in qualitative inquiry. Sample size depends on what you want to find it out, why you want to find it out, how the findings will be used and what and how much resources, including time are available. The logic of purposeful sampling is quite different. The problem is, however, that the utility and credibility of small purposeful samples are judged on the basis of the logic, purpose, and recommended sample sizes of probability sampling. Instead, purposeful samples should be judged according to the purpose and rationale of the study: Does the sampling strategy support the study's purpose? The sample, like all other aspects of qualitative inquiry must be judged in context-the same principle that undergirds analysis and presentation of qualitative data. Random probability can not accomplish what in depth, purposeful samples accomplish and vice versa (Patton, 2002).

Table 11.2 Sampling strategies

Type	Purpose
Random probability sampling	Representativeness: sample size a function of population size and desired confidence level
1. Simple random sample	Permit generalization from sample to the population it represents
2.Stratified random and cluster samples	Increase confidence in making generalizations to particular subgroups
Purpose sampling	Select information-rich cases strategically and purposefully; specific type and number of cases selected depends on study purpose and resources
1. Extreme or deviant case (outlier) sampling	Learning from unusual manifestations of the phenomenon of interest, for example, outstanding successes/notable failures; top of the class/dropout; exotic events; crises
2. Intensity sampling	Information-rich cases that manifest the phenomenon intensely, but not extremely, for example: good student/poor student; above average/below average
3. Maximum variation sampling-purposefully picking a wide range of cases to get variation on dimensions of interest	Document unique or diverse variations that have emerged in adapting to different conditions. Identify important common patterns that cut across variations (cut through the noise of variation)
4. Homogenous sampling	Focus; reduce variation; simplify analysis; facilitate group interviewing
5. Typical case sampling	Illustrate or highlight what is typical, normal, average
6. Critical case sampling	Permits logical generalization and maximum application of information to other cases because if it's true of this one case, it's likely to be true of all other cases
7. Snowball or chain sampling	Identify cases of interest from sampling people who know cases are information rich, that is, good examples for study, good interview participants
8. Criterion sampling	Picking all cases that meet some criterion, for example all children abused in a treatment facility. Quality assurance.
9. Theory-based sampling, operational construct sampling or theoretical sampling	Finding of manifestations of a theoretical construct of interest so as to elaborate and examine the construct and its variations
10.Confirming and disconfirming cases	Elaborating and deeping initial analysis, seeking expectations, testing variation
11. Stratified purposeful sampling	Illustrate characteristics of particular subgroup of interest, facilitate comparitions
12. Opportunistic or emergent sampling	Following new leads during fieldwork, taking advantage of the unexpected, flexibility
13. Purposeful random sampling	Add credibility when potential purposeful sample is larger than one can handle. Reduces bias within a purposeful category. (Not generalization or representativeness
14. Sampling politically important cases	Attract attention to the study (or avoid attracting undesired attention by purposefully eliminating from the sample politically sensitive case
15. Convenience sampling	Do what's easy to save time, money, and effort. Poorest rationale, lowest credibility. Yields information-poor cases
16. Combination or mixed purposeful sampling	Triangulations, flexibility, meet multiple interest and needs.

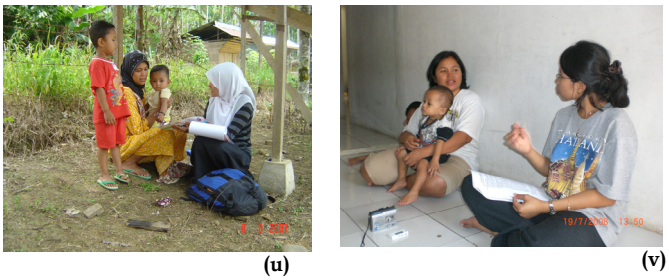
Source: Patton MQ, 2002.

Once the researchers have identified sites and people, methods of how data will be gathered needs to be determined. As in-depth interview, observation and group discussion are the hallmarks of qualitative research, the art of asking, listening and interpreting will be built upon experiences and experienced researchers eventually

develop a creative skill to enable people to tell their stories (Ulin, Robinson and Tolley, 2005).

As the data collection process continues, researchers need to resolve some field issues such as inadequate data or needing to prematurely leave the study site. Finally researchers must decide how they will store the data so that data are protected from damage or lost.

- *In-depth interviews*



(u) (v)

Figure 11.3. Interviewer and interviewee/informant were having borderless, side-by-side sitting

The interview is the most widely used method of data collection in qualitative health research, which involves an exchange of information between one interviewer and one respondent (Green and Thorogood, 2004). In most interviews, the interviewee is expected to respond to the questions, but in qualitative research, an interviewee is invited to take a bigger and more active role than merely responding, but to determine the discussion's flow (Ulin, Robinson and Tolley, 2005). If we look at a continuum scale in Figure 11.2, *structured interview* is at one end of the scale and *informal interview* is at the other end.

In a structured interview, interviewer must follow strict guidelines in a specified order so that responses can be compared between each respondent. Informal interviews are more like natural conversation in which data are gathered opportunistically. Another commonly used qualitative research technique is the *semi-structured or in-depth interview*. In an in-depth interview, the interviewer is guided by a list of topics, yet the interviewee has the freedom to determine what kind of information produced concerning the topics. The differences lie in the control that the interviewer imposes to the informants (Green and Thorogood, 2004).

Food Habits among Adolescent Girls

1. Are you familiar with any dieting products? Which one? What are the benefits promoted with the products? Are you one of the users? What do you feel after using the product?
2. Tell me about your meal pattern at home and also outside home. Any reasons for complying with such pattern? How about consumption pattern of vegetables and fruits?
3. Where do get all of the information about food? What do you think about TV ads?

Figure 11.4. Sample of semi-structured questionnaire

In qualitative research, all interviewers need to be aware of how the social context including human interactions, influences the meaning of what is said. Language used in an interview is used in ways beyond their intrinsic content. It tells us about the respondent, how they interpret the topic, classify and represent the phenomena.

Food Habits among Adolescent Girls

1. Do you ever skip meal? ☐
   (1) Yes
   (2) No, go to number 3
2. If yes, how many times do you skip in the last 7 days in.. ☐

No	Time	Skip how many times
1	Breakfast	
2	Lunch	
3	Dinner	
4	NA	

3. In the past 7 days, how many times did you eat fresh fruits?
   ☐ Times
4. In the past 7 days, how many times did you eat fresh vegetables?
   ☐ Times
5. Do you do any special diet to lose your weight or keeping from gaining weight? ☐
   (1) Yes
   (2) No, go to number
6. If yes, what kind of diet you do? Please specify……
7. Who told you to do the diet? ☐
   (1) Doctor
   (2) Nurse
   (3) Mother/ parents
   (4) Sisters
   (5) Friends
   (6) No one
   (77)Other, please specify……..
   (66)Don't know
8. Do you consume pills (example: laxing, dulcolax, or other laxative drug) or slimming tea (green tea, slimming tea, etc) to lose your weight or keeping from gaining weight? ☐
   (1) Yes
   (2) No
9. Do you consume any supplements? ☐
   (1) Yes, please specify……..
   (2) No, end the session
10. How many times you drink the supplement in the last 7 days? ☐
    ☐ Times

Figure 11.5. Sample of structured questionnaire

- *Focus Group Discussion (FGD)*

Among the most widely used research tools in the social sciences are group depth interviews, or focus groups. Originally called *focused interviews*, this technique came into vogue after World War II and has been a part of the social scientist's tool kit ever since. The focused group interview had its origin in the Office of radio Research at Columbia University in 1941, when Pail Lazarsfeld invited Robert Merton to assist him

in the evaluation of audience response to radio programs (Stewart and Shamdasani, 1990).

Focus groups are a form of group interview that capitalizes on communication between research participants in order to generate data. Although group interviews are often used simply as a quick and convenient way to collect data from several people simultaneously, focus groups explicitly use group interaction as part of the method. This means that instead of the researcher asking each person to respond to a question in turn, people are encouraged to talk to one another: asking questions, exchanging anecdotes and commenting on each others' experiences and points of view. This method is particularly useful for exploring people's knowledge and experiences and can be used to examine not only what people think but how they think and why they think that way (Kitzinger, 1995).

(w)

(x)

Figure 11.6. Typical FGD in rural setting (left); FGD using pile sorting technique among mothers (right).

Generally a focus group deals with 8-12 participants. The moderator is the key to assuring that a group discussion goes smoothly. The focus group moderator generally is well trained in group dynamics and interview skills (Stewart and Shamdasani, 1990). It is also important to underline that a group discussion needs an observer or note taker who may do the following:

- record key issues and other factors that may influence the interpretation
- record the responses from the group.
- record observation of any non-verbal messages, indicate the feeling of the participants about the topic under discussion.
- help the moderator if necessary; and point out questions that are not well explored, missed or suggest areas that could be further investigated.

Debus (1990) mentions that in order to determine how many groups are needed, it is first necessary to gather some information about the topic under study. Some guidelines for setting the number of groups are as follows:

- *Conduct at least two groups for each variable considered relevant to the topic area.* For example, conduct two groups among each major target population segment (e.g. younger mothers and older mothers, first-time fathers and multiparous fathers, etc) if such segments are considered substantially different in attitudes or behaviors related to the topic area.
- *Conduct groups until no more new information emerges.* That is, conduct groups until the outcome conforms in a general way with previous results. If two

groups on the same topic produce wildly different results, it is necessary to explore this difference in additional groups to make the research results understandable and usable.

- *Conduct groups in each geographic region where a meaningful difference is felt to exist.* Such differences are likely to be important when the issue being studied is influenced by climate, weather, water condition, local economic conditions or some other geographic or economic features.

Debus (1990) explains that focus groups are generally conducted among homogenous target populations. Answering the question "Which respondent variables represent relevant similarities among the target population?" requires some thoughtful consideration when planning the research. The following respondent variables should be considered:

- *Social class*. It is always advisable to conduct a group session among respondents who have similar social status. When social classes are mixed, the more literate and articulate higher-class respondents may suppress participation by lower-class respondents who may feel inadequate even when they may know quite a bit about the issues under discussion.
- *Lifecycle*. For example, new mothers or women who are newly involved in family situations may respond substantially differently from older mothers or mother with a larger family, even when the basic age of the mothers is similar. In such cases, the less experienced mother is apt to defer to veteran.
- *User status*. It is best to separate the doers and non-doers. However, there may be reasons for including them in the same group, such as when the intention of the group is to explore or highlight the contrasts between such groups.
- *Level of expertise*. The level of experience or expertise that a respondent has can greatly affect his or her responses to a particular topic. For example, a respondent who has been exposed to a particular product for a considerable length of time may be different from a new user. This is true especially when length of usage corresponds to the level of knowledge and expertise.
- *Age/marital status*. Depending on the subject under investigation, respondents of substantially different age and/or marital status generally should not be combined.
- *Cultural differences*. This is particularly true when cultural differences may have impact upon the attitudes and behaviors of the topics under discussion.
- *Sex*. There is a sharp division among focus group moderators regarding the effectiveness of mixing sexes within a particular focus group. Some moderators believe this is never wise because it may inhibit conversation or interfere with the order and flow of discussion. Others feel it is highly desirable to mix the sexes when the topics being discussed concern joint decision. One approach for handling this dilemma is to experiment with both conditions and see if the results differ.

There are several issues related to the implementation of FGD. These include determining the setting and seating arrangements for the FGD.

General points to consider when setting up an FGD:

- The setting should provide privacy for focus group participants.
- Select a location where it is easy to hear respondents speak.

- Select a comfortable location.
- Select non threatening environment. Schools or government buildings may induce a desire to respond "correctly".
- Select a location that is easily accessible by respondents.

Seating arrangements for an FGD can vary, but generally focus groups are conducted around a conference table, in a sitting room atmosphere or in some other room arrangement that seems natural to the respondents. The sitting arrangement should encourage involvement and interaction. The following are the guidelines:

- Avoid designating status in the seating arrangement.
- Make it possible for the moderator to have good eye contact with all respondents.
- Seat respondents at approximately equal distances from the moderator and clearly in sight of all other participants.

However, in developing countries – the rural setting specifically – the research team should assess the common gathering style of the local people. In most experiences, sitting on the floor covered with mat or carpet in a circular form is the most comfortable manner (Figure 11.7).

(y)

Figure 11.7. Seating arrangement of a mixed-sexes focus group

Table 11.3. When to use focus groups or indepth interviews?

Issue to consider	Use focus groups when …	Use indepth interviews when …
Group interaction	interaction of respondents may stimulate richer response or new and valuable thoughts.	group interaction is likely to be limited or nonproductive.
Group/peer pressure	group/peer pressure will be valuable in challenging the thinking of respondents and illuminating conflicting opinions.	group/peer pressure would inhibit responses and cloud the meaning of results.
Sensitivity of subject matter	subject matter is not so sensitive that respondents will temper response or withhold information.	subject matter is so sensitive that respondents would be unwilling to talk openly in a group.
Depth of individual responses	the topic is such that most respondents can say all that is relevant or all that they know.	the topic is such that a greater depth of response per individual is desirable, as with complex subject matter and very knowledgeable respondents.
Logistics	an acceptable number of target respondents can be assembled in one location.	respondents are geographically dispersed or not easily assembled for other reasons.
Cost and timing	quick turnaround is critical, and funds are limited.	quick turnaround is not critical, and budget will permit higher cost.

Source: Debus, 1990

The conforming group session

Problem: In this group, members should comply or agree with the rules. Because focus groups generally deal with personal attitudes and beliefs that are not readily verifiable, there is a danger that group members will verbalize responses that simply go along with what other respondents have said and that do not express their true individual feelings. This is particularly problematic because it is difficult to determine whether respondents are conforming or whether a genuine consensus exists.

Strategy: Emphasize respondents' freedom to disagree during the opening section of the group and demonstrate respect fro divergent opinions throughout the group. Another tactic is to have respondents report their opinions regarding a key issue secretly first, followed by an open discussion. This may be accomplished by having each respondent note his/her opinion on a piece of paper as the issue is introduced to the group. Although the paper is never viewed, it forces the group member to take a position that is less easily swayed by others in the group. Less literate respondents can do this by using pictorial scales, such as the happy face scales.

Source: Debus M, 1990.

The dull group session

Problem: The dull group is characterized by a general lack of enthusiasm and involvement on a group level. General apathy among group members may be due external factors. For example, respondents may have felt forced to attend the group or may be suspicious of the group process. The subject matter may be intimidating or simply uninteresting to the group, or respondents may not be properly qualified for discussion. Respondent apathy may also occur as a result of intrinsic factors. For example, the group may be too large, making interaction difficult. It may be over-organized and inflexible so that spontaneity id stifled, or it may be too loosely organized, leaving respondents dismayed. The moderator's tone may be too formal, intimidating, or too casual, appearing phony to the group. The group may proceed too quickly, preventing thoughtful respondents from participating, or too slowly, creating boredom on the part of group members.

Strategy: Set up the group realistically and thoughtfully in order to eliminate many outside factors that contribute to group apathy. A skillful and experienced moderator will circumvent many of the inside contributing factors. In addition, the following specific tactics may be useful in stimulating a dull group:

- If the subject matter does not seem to interest respondents, enthusiasm may be enhanced by asking the group to interact with the topic in a novel manner, such as creating personal stories around a key issue.
- If the subject matter seems too remote or abstract for respondents to relate to, it may be made more concrete by using stimulus materials such as concept boards or pictures of situations related to the topic area.
- If subject matter seems too intimidating or personal, group members may be encouraged to talk by using projective techniques (expressing "own" opinion indirectly via other's thoughts i.e. by using role playing, cartoon completion, or association)
- Respondent involvement may occasionally be increased by somewhat confrontational behavior on the part of moderator.
- Occasionally a short break will be required, permitting group members to move around and have side conversations that can be pursued later. This allows the moderator to "re-group", possibly consult with other members of the team and get a fresh start.

Source: Debus M., 1990.

Some special respondent problems

The dominating respondent. This person attempts to take over the group – initiates the conversations, defends his/her position, seeks to influence others and must have last word. *Strategy I:* Avoid eye contact, or turn body away fro the dominating respondent. Call on other members of the group by name. If necessary, politely tell the dominating respondent that although his/her thoughts are very interesting, you'd like to have ideas of the other group members as well. *Strategy II:* On occasion it may be necessary to ask a dominating respondent to leave the group. This can be done by explaining to the respondent that "because you know so much about _____, we'd like you to complete a more detailed, in-depth questionnaire on the subject." A "diversionary" questionnaire can then be administered to the dominant group member outside of the group room.	**The irrelevant respondent.** This person makes comments that don't relate to the topic area and can steer the group off the subject. He/she may be truly unknowledgeable, nervous, or simply a poor listener. *Strategy:* Try restating the question or paraprashing. Consider coming back to the question later. **The questioning respondent.** This person continues to ask the moderators for his/her opinions and feelings. *Strategy:* Plead lack of experience or expertise on the subject. If that is inappropriate, acknowledge the situation ("Like anyone else, of course I have an opinion about this, but our purpose today is to find out how you feel….").
The timid respondent. This person is hesitant to speak at all, may be generally shy or anxious about the group situation, may or not feel his/her opinions are worthwhile. *Strategy:* Use eye contact to pull the timid group member into the discussion and to communicate interest in what he/she has to say. Observe the timid member closely to see when he/she is ready to speak. If necessary, find an easy, nonthreatening question and encourage a direct response. If respondent becomes too ill at ease, continue the discussion with other respondents and come back to him/her later.	**The negative respondent.** This person is negative in all responses. He/she may be using this discussion to vent years of frustration and hostility. He/she may be determined not to tell you any favorable ideas or information. *Strategy:* Be careful. Avoid reacting defensively. Try to defuse the respondent by acknowledging his/her hostility or negativism ("You seem to be angry about this. That's okay, because I want to find out how you really feel…"). Try playing devil's advocate or probing the third person ("What about other people that you know? How do you think they would feel about this issue?").

Source: Debus M. , 1990.

- *Observation*

Observation is a complex research method because it often requires the researcher to play a number of roles and to use a number of techniques, including the five senses of the researcher, in collecting the data. In addition, despite the level of involvement with the study group, the researcher must always remember her/his

primary role as a researcher and remain detached enough to collect and analyze data relevant to the problem under investigation (Baker, 2006).

This method provides the opportunity to document activities, behavior and physical aspects without having depended upon peoples' willingness and ability to responds to questions. The strength of observation is that it permits researchers to study people in their native environment in order to understand thing from their perspective. "Seeing" and "listening "are key to observation. According to Green and Thorogood (2004), it also allows the investigator to record the mundane and unremarkable features of everyday life that interviewees might not feel like commenting on or the context within which they occur.

In general, the technique can be divided based on participation and attendance of researcher. On the basis of participation of researcher, observation is devided into participant and non-participant method. Meanwhile, direct and indirect observations are based on the attandance of researcher. The objective of the research will determine which technique will be used.

One key for observation is to remain on the fringe, watching people and events as unobstructively as possible, observing without participating. The researcher gathers data without interacting with participants' activity. This approach is used to capture how something happens rather than how other people perceive it happenning, gathering impression by direct observation instead of through study participants' eyes and ears. It can be applied to validate interview data or other information. The quality of the data will depend on the ability of researcher to watch and listen without interrupting the natural flow of activity (Ulin, Robinson and Tolley, 2005).

The participant method requires the presence of the researcher to some extent in the field study. It brings the researcher into direct interaction with people and their activities. In initiating this approach, researcher is challenged to be able to adapt her/his interactive style to the participants' culture. The common goal is to enable people to accept and interact with the researcher as naturally as possible whic may lead for the participants to act as if the researcher is not being there (Ulin, Robinson and Tolley, 2005). Green and Thorogood (2004) explain some consideration in planning a participant observation, which are:

- Identifying a site
- Gaining access
- Refining observational skill
- Approaches to recording data

(z)

Figure 11.8. Direct observation of a school surrounding

Direct observation also requires the present of the researcher, however, it does not entail the active participation of researcher. Indirect observation can be placed under a non-participation approach. It uses documentary or recorded resourcees.

As interview, observation also has a wide continuum, from unstructured observation to structured observation (Figure 11.2). In a structured observation, observer needs to follow strict guidelines in a specified order so that responses can be compared between each respondent. To obtain general overview of a phenomenon or for a preliminary stage to generate idea, unstructured observation is suitable.

Field notes are needed to record an observation. The form can be in a observation guide, recording sheets or checklists or essais. A high-quality of fieldnotes need to be clear, detailed and decriptive and not overemphasized. The journalist's enquiry on who, what, when, where, why, and how-is also useful guide to recording field observation (Ulin, Robinson and Tolley, 2005). Writing up the result as soon as possible is needed in order not to lose most of the salient things during observation. Beside the date and location, a short description of the context in which the observation occured is essential to enrich the analysis afterward. Other ways to record the observation is by using picture; photographs or video tapes.

Midwife's counseling practice

Location: …….
Date: ……
Time: ……
Patient: Pregnant/ Lactation mother

1. Did midwife greet her patient properly?
   □ yes □ no
2. Did midwife ask her patient ask her patient problem (any problem)?
   □ yes □ no
3. Did midwife allocate her time for breastfeeding counseling?
   □ yes □ no
4. Did midwife ask her patient about any breastfeeding problem?
   □ yes □ no
5. Did midwife speak clearly and distinctly?
   □ yes □ no
6. Did midwife allocate for questions and feedback?
   □ yes □ no
7. Did midwife answer her patient question clearly & properly?
   □ yes □ no
8. Did midwife demonstrate a thorough knowledge on breastfeeding and lactation management?
   □ yes □ no

Other comments:
……
……
……

Figure 11.9 Sample of structured observation guide

Midwife's clinical practice

Location: ……
Date: ……
Time: ……

1. How is the communication between midwife and patients?
2. How is the physical contact midwife having with patients?
3. How is the patients' response toward their midwife explanation?
4. Ways in which midwife praise their patients?

Other comments:
……
……
……

Figure 11.10. Sample of unstructured observation guide

Do people need to know that they are being observed?

Observation can be overt (obtrusive-everyone knows that they are being observed) or covert (unobtrusive-people do not know). The extent to which people need to be informed depends upon the situation and evaluation purpose. People may or may not be asked for their full and informed consent. Given that people often behave differently when they know they are being observed, covert observation is appealing. However, it is essential that neither the observation nor the resulting report harms the people observed. While there is no consensus in social science research about how explicit to be about observations, the ethics and morality of evaluation must always be considered.

Source: www.managementstudyguide.com/observation_method.htm

Rapid Assessment Procedures (RAP)

Programs for health and development have seldom waited for lengthy and careful scientific studies to guide their development or revision. The traditional approaches of anthropology, sociology, and related fields such as demography have proved mostly to be too expensive, time-consuming, and cumbersome.

The application of anthropology to program planning and evaluation assumes that there are other important tools for understanding human behavior in addition to the large survey and the "quick and dirty" field trip. In fact, everything quick is not necessarily dirty, and time does not insure cleanliness.

Anthropological research attempts to understand social phenomena from an insider perspective rather than by imposing a investigative framework from the outside. It acknowledges the unexpected and places such findings in their appropriate cultural context.

The following methods are commonly used in parallel or sequential order in RAP:

- *Informal interviewing*: Open-ended questions are asked and recorded about specific topics following a general outline and allowing additional subjects to be incorporated as they arise.
- *Conversations*: Informal conversations with informants or with small groups are incorporated in the data.
- *Observation*: Careful documentation of observed events and behaviors provides valuable nonverbal clues as to what is actually occurring.
- *Participant observation*: Participation in an observation of daily socio-cultural context of a household or community.
- *Focus groups*: Small homogenous groups are gathered for group discussions of appropriate topics.
- Collection of data from *secondary sources*: Previously published and unpublished research, government and community records, and health services records.
- Some *structured questions* used for inventories and demographic information.

Those using this approach should bear some following issues concerning the use of anthropological methods in the rapid assessment:

- Convincing others of the validity and reliability of the approach
- Finding or training skilled evaluators and field workers
- Interpreting results in ways understandable to the community, the program planners and providers
- Recognizing the limitation of the approach

Source: Scrimshaw SCM, 1992.

Note: Some other names used for RAP type of research:

- Rural Appraisal Participation
- Participatory Rapid Appraisal
- Participatory Research and Development
- Participatory Research Appraisal
- Participatory Rural Appraisal
- Participatory Assessment and Planning
- Participatory Technology Development
- Participatory Learning Methods
- Participatory Action Research
- Participatory Learning Appraisal

Positive Deviance

The premise: In every community there are certain individuals whose uncommon practices/behaviors enable them to find better solutions to problems than their neighbors who have access to the same resources.

Positive Deviance (PD) Approach:

- Identifying solutions to community problems within the community today
- The Key Question:
  - What enables some members of the community (the "Positive Deviants") to find better solutions to pervasive problems than their neighbors who have access to the same resources?

Positive Deviance Inquiry:

- The community must discover what the PDs are doing that is different from their neighbors
- The PD Inquiry is the tool that
  - enables the community to discover the uncommon PD behaviors/strategies
  - establishes community behavioral norms related to the problem to be addressed
  - uncovers successful uncommon behaviors/strategies practiced by the Positive Deviants

Analyzing PD Findings

- PDI findings are passed through a conceptual *"accessibility sieve"*
- Only those behaviors/strategies accessible to all are kept. The rest are "TBU," True but Useless (i.e. not accessible to all) and are discarded

The Six Ds of Positive Deviance Approach

1. *Define*. Define the problem, its perceived causes and related current practices (situation analysis). Define what a successful solution/outcome would look like (described as a behavioral or status outcome)
2. *Determine*. Determine if there are any individuals/entities in community who ALREADY exhibit desired behavior or status (PD identification)
3. *Discover*. Discover uncommon practices/behaviors enabling the PDs to outperform/find better solutions to the problem than others in their "community"
4. *Design*. Design and implement activities enabling others in "community" to access and PRACTICE new behaviors (focus on "doing" rather than transfer of knowledge)
5. *Discern*. Discerns the effectiveness of activities or project through ongoing monitoring and evaluation
6. *Disseminate*. Disseminate successful process to appropriate "other" (scaling up)

Source: www.positivedeviance.org

d. What to consider when going to the field?

- *Prior to going to the field*

Before planning and implementing field studies, ethical considerations should be taken into account. The ethical considerations deal with the integrity of the investigators and the protection of the target population and community or setting where the field work will be conducted.

(aa)

Going to the Field

(bb)

Preparation period: Allow sufficient time to get some information about the area prior to the actual visit. This can be used as an immersion strategy. Some useful source of information may include: 1. Vital statistics 2. Official reports 3. Secondary literature e.g. poem, folk songs, recipe books	***Field – techniques and methods:*** 1. Transect walk 2. Participative observations 3. Focus group discussions 4. Key-informant in-depth interviews 5. Rapid assessment methods 6. Positive Deviance (PD)
During participative observation, where and what to observe and consider? 1. Local markets • Inside and outside the market: cash transaction (domesticated products) *versus* barter (gathered items e.g. honey, mushroom, condiments, etc) • What is food? Who sells? Who buys? Food price? Food exchange? 2. Gardens and house yards • Inside and outside the village • Food resources/supply, nutrition and pattern of living, feeding pattern, diet strategies, accessibility of resources 3. Household and kitchen • Kinship system, pattern of living • Decision about meals, raw versus cooked food, who prepares food, meal versus snack, eating priorities, gender and food 4. Ceremonies and events • Social food, status food, gender and food distribution, food and identity 5. Season during the field visit • E.g. dry, rainy, harvest, drought, flood, normal versus exceptional year, unrest	***The resource persons:*** 1. Household members including the children • Food versus non food: what is edible and what is not 2. Older people • Food during crisis and emergency, food and identity, food as medicine and medicine as food, etc 3. Gender representation • Male food versus female food: e.g. fresh versus leftover food 4. Local specialists • Traditional healers including traditional birth attendants (TBAs): parallel food classification, food taboos, food as medicine and medicine as food, etc • Tribal and religious leaders: sacred versus profane food, food and identity, social food, ritual food distribution, etc • Teachers: food versus social/religious/political/migration/ globalization impacts

Participants and officials or institutions responsible for nutrition and health in the community should be aware of the project and well informed about the purpose, expectations, and practical consequences for themselves (den Hartog et al, 2006).

Approval by a local ethical committee is currently desired and even required to get the project funded or the results published in a scientific journal. Therefore, the principle investigator must submit a research protocol to the committee. If such a committee is not available for the research area, an *ad hoc* committee must be set up. In addition to the protocol, the committee will ask for the information presented to the study participants before they give their informed consent. Briefly, the committee only will approve the study if the results will lead to new, scientifically sound information. In addition, the type of research must be the most efficient way to obtain information. The information provided to the participants should also be complete and fully understood by them (den Hartog et al, 2006).

- *Ethical issues in anthropology*

On occasion, the concept of "ethics" is used as a weapon: i.e. my beliefs differ from yours, therefore you are unethical. Anthropologists who speak of ethics in this sense wish to improve or, at the least, reprove the behavior of others. A "Code of Ethics" in their view is a mechanism to help regulate the behavior of those with whom they disagree. Unfortunately, as historians and ethnographers have documented, the attempt to control others in the name of morality is more likely to lead to confrontation than moral improvement (Cassell and Jacobs, 2006).

Many anthropologists were moved to enter the discipline because of a strong concern for the peoples of the world. During their fieldwork, most have developed a strong empathy for the peoples they have studied and have felt a sense of personal responsibility for their welfare. Hence, when they use, hurt, or endanger others, it is usually not because of a vicious disposition, but because they are under strong pressures, some of which are conflicting or difficult to reconcile, and they may then drift into an expedient course of action that proves unwise (Cassell and Jacobs, 2006).

The cross-pressures of modern fieldwork are severe, and they can easily induce an investigator to treat the host people as "subjects," rather than as fellow human beings whose autonomy must be respected. While completing a graduate degree, or submitting a prompt report to an employer or client, or resolving an intense emotional relationship, we may neglect to consider other factors in the situation or the consequences our actions will have for others. Convictions, leading presumably to the abstract and universal benefit of humanity, can be used to justify the violation of agreements entered into with good faith on both sides. Awareness that others are acting exploitatively or immorally can seductively encourage us to adopt a similar orientation. In the field especially, situations may be so complex, involve so many parties and so much factionalism, that it becomes difficult to decide what must be done. We do not wish to make ethics seem merely a matter of isolated choices in crucial situations. Much of our lives proceed undramatically, and often our decisions are almost imperceptible, so that only with hindsight are we aware that our course of action had consequences that we had not foreseen and now regret. To improve the ethical adequacy of anthropological practice, we must consider not only exceptional cases but everyday decisions, and reflect not only upon the conduct of others but also upon our own actions (Cassell and Jacobs, 2006).

A sample case: The Hazardous Consent Forms

As part of a long-range investigation of the social and physiological effects of heroin, Jim Sanders, an anthropologist affiliated with a medical school, set up a study of pregnant women and their infants. The study design involved statistical comparisons of the course of pregnancy, birth, and infant development in 30 addicts and 30 nonaddicts; data were to be gathered from hospitals and public health clinics in three inner city neighborhoods.

The medical school Institutional Review Board (IRB) approved the study, with the requirement that the women sign detailed consent forms indicating that they understood the purpose of the study and agreed to take part. It was agreed that the clinic nurses would read the consent forms to the women and ask them to sign.

Two months into the study, Sanders, visiting the research sites, discovered that few nurses were using the consent forms; instead, informal undocumented consent was being obtained.

Sanders was in a quandary. Institutional Review Boards are designed to protect those studied from harm and, also, to make sure that people do not unknowingly or unwillingly participate in research that might put them at risk. The medical school IRB, accustomed to biomedical experiments posing the risk of physical harm to subjects, routinely required written consent from those studied. In this case, however, the research posed no possibility of physical harm; instead, the only risk to those studied came from the signed consent forms: these would document that addicted women were engaging in illegal behavior.

Should Sanders go back to the Institutional Review Board and attempt to educate them about social research? This might obstruct his project or endanger his research subjects. Should he leave well enough alone, let the IRB think he was following their procedures while allowing the nurses to continue obtaining verbal undocumented consent? In deceiving--or at least, not enlightening--the IRB, he would protect his research subjects. What else might he do to protect his subjects and his study without condoning deception?

Source: Casell J and Jacobs SE (eds), 2006.

Despite difficulties in writing a code specific enough to use as a mechanism of social control, a code of ethics can help improve anthropological practice. When it is conceived as a way of reflecting upon our own practices and attempting to improve them, as well as a method for regulating behavior, a code can heighten sensitivity to professional conduct. In this twofold approach, a code is concerned with aspirations as well as avoidances; it represents our desire and attempt to respect the rights of others, fulfill obligations, avoid harm, and augment benefits to those we interact with as anthropologists. Such a code is less a set of categorical prohibitions engraved in stone, than a series of aspirations, admonitions, and injunctions to be considered, discussed, and periodically altered by the community of anthropologists. The process here is as valuable as the product (Cassell and Jacobs, 2006).

Case studies offer another way to heighten sensitivity and improve anthropological practice. An ethical dilemma may be difficult to recognize when encountered; "practical" decisions frequently turn out to have ethical ramifications. Reading and thinking about situations faced by other anthropologists can help us to

recognize our own ethical dilemmas and to make sensitive and informed decisions (Cassell and Jacobs, 2006). The above case study is one example.

11.4. Validity and Reliability of Qualitative Research

Every single research must face questions that stand as criteria to examine the trustworthiness of a research project. These questions, as summarized by Marshall and Rossman (1989), were posed to challenge the conventional research criteria for:

- *internal validity* - how truthful are the findings of the study?
- *external validity* - how the findings can be generalized to other group of people?
- *reliability* - how can we be sure that the findings would be replicated in the same population and context?
- *objectivity* - how can we be sure that findings are reflective of the subjects rather than the product of the researcher's biases?

Lincoln and Guba (1985) propose four alternative constructs which are more appropriate within qualitative paradigm.

- The first one is *credibility*. A qualitative research, conducted in natural setting and trying to demonstrate an in-depth description and showing complexities of variables and interactions is valid within the setting, population and theoretical framework. Data is so much embedded with the setting and must be valid. However a qualitative researcher must then adequately state the parameters.
- The second construct is *transferability,* in which the applicability of the findings to another context depends of the researcher who would make the transfer rather than on the original investigator. A qualitative research is developed based on a theoretical framework, in a particular population and setting. Thus, to make a generalization, the researcher should make a judgment about the relevancies of the first study to the second setting.
- The third concept is *dependability*. It represents a very different assumption from those of reliability. The social world which the qualitative research commonly studied is always changing, whereas the concept of reliability assumes the unchanging environment and universe, thus research findings could logically replicated.
- The last concept is *confirmability,* by assuring that the findings can be confirmed by another. Several measures to provide 'objectivity' should be taken by a qualitative researcher, such as:
  - A research partner who should keep questioning the researcher's analysis
  - A constant search for negative instances
  - Practicing value-free note taking
  - Taking note for all research design decision and the rationale behind it

Table 11.4. Comparation of quality assessment criteria used in classical, critical and constructionist paradigms

Paradigm	Criteria	Descriptions
Classical Paradigm	• Internal validity	• isomorphism of findings
	• External validity	• generalizability
	• Reliability	• stability/consistency of measurement
	• Objectivity	• distanced - neutral observer (for post-positivism: probabilistic and inter-subjectivity)
Critical Paradigm	• Historical situatedness of inquiry	• i.e., that it takes account of the social, political, cultural, economic, ethnic and gender antecedents of the studied situation
	• "Conscientization"	• the extent to which the inquiry acts to erode ignorance and misapprehension
	• "Unity of theory and praxis"	• the extent to which it provides a stimulus to action, i.e., to the transformation of the existing structure
Constructionist Paradigm	• Trustworthiness	• credibility (paralleling internal validity) • transferability (paralleling external validity) • confirmability ("objectivity")
	• Authenticity	• ontological authenticity (enlarges personal construction) • educative authenticity (leads to improved understanding of others) • catalytic authenticity (stimulates to action) • tactical authenticity (empowers action)

Source: Guba and Lincoln (1994) in Denzin and Lincoln (2000)

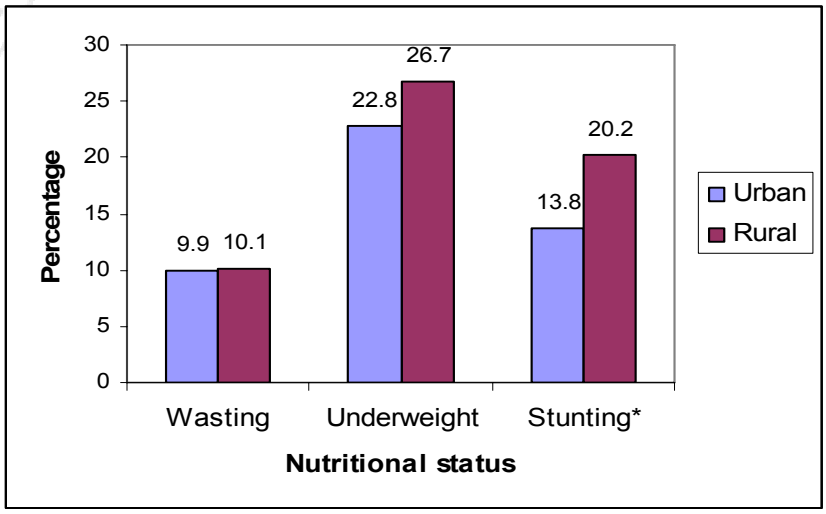
Summary

Qualitative research is appropriate to capture and understand social phenomenon, including research topic related to nutritional anthropology.

The approach involves iterative process, therefore it allow us to explore unexpected topic during the conduct of the research.

The primary methods of data collection in qualitative research are interview, observation and group discussion.

Learning Activity 11.1 Below is data on nutritional status of children under the age of five in urban and rural areas (N=1025)



Task: Using the above figure, develop two research questions to address

- Why is this question important?
- Who will you collect the information from - the target group (children, mothers, others)?
- What do you need to ask?
- What other data will you need for supporting information?

Learning Activity 11.2.

Task. Carry out an observation in a public place.

- Observe and note on how people behave and interact with the surrounding.
- First, do a non-structured observation.
- Soon after you find what most interest you, do a structured observation.
- Compare your observation with those of your colleagues.

Learning Activity 11.3. Role play using FGD, decide one topic of discussion.

Task:

People involved:

- One volunteer is needed to play a role as a moderator.
- Five volunteers will play as FGD participants. One "special" character will be assigned to each FGD participant (e.g. shy participants, dominating participant, irrelevant participant, etc).
- Others will play roles as observers.

Procedures:

- Decide one nutrition/health topic for discussion.
- Time allocation: 15 minutes
- For moderator:
  - Introduce yourself and the purpose of discussion
  - Moderate the process of discussion
  - Conclude the discussion session

References

Baker LM. Observation: a complex research method. Illinois: Library Trends, 2006.

Casell J and Jacobs SE. Introduction. In: Casell J and Jacobs SE (eds). Handbook on ethical issues in anthropology. A special publication of the American Anthropological Association number 23. Arlington: American Anthropological Association, 2006.

Counihan CM. The anthropology of food and body: gender, meaning, and power. New York: Routledge, 1999.

Creswell JW. Qualitative inquiry and research design: Choosing among five approaches. Thousand Oaks: Sage, 2007.

Debus M. Methodological review: A handbook for excellence in focus group research. Washington DC: Academy for Educational Development (AED), 1990.

Den Hartog AP, van Staveren WA, and Brouwer ID. Food habits and consumption in developing countries: Manual for field studies. Wageningen: Wageningen Academic Publishers, 2006.

Green J and Thorogood N. Qualitative methods for health research. London: Sage, 2004.

Kitzinger J. Qualitative research: Introducing focus groups. BMJ 1995; 311: 299-302.

Lincoln Y S and Guba EG. Naturalistic inquiry. California: Sage Publications, 1985.

Marshall C and Rossman GB. Designing qualitative research. California: Sage Publications, 1989.

O'Sullivan GA, Yonkler JA, Morgan W and Merritt AP. A filed guide to designing a health communication strategy. Baltimore, MD: Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs, 2003.

Patton MQ. Qualitative research and evaluation methods 3rd ed. California: Sage Publications, 2002.

Scrimshaw SCM. Adaptation of anthropological methodologies to rapid assessment of nutrition and primary health care. In: Scrimshaw NS and Gleason GR (eds). RAP: Qualitative methodologies for planning and evaluation of health related programs. Boston: International Nutrition Foundation for Developing Countries (INFDC), 1992.

Stewart DW and Shamdasani PN. Focus Groups: Theory and practice. California: Sage Publications Inc., 1990

Ulin PR, Robinson ET, and Tolley EE. Qualitative methods in public health: A field guide for applied research. San Francisco: Jossey-Bass, 2005.

CHAPTER 12

Data Analysis and Presentation in Nutritional Anthropology

Airin Roshita, Judhiastuty Februhartanty, Andi Mariyasari Septiari

Objectives:

1. To describe issues in qualitative data analysis, i.e. how to perform the analysis, how to display the findings, and how to make conclusions.
2. To explore some considerations in choosing computer programs for qualitative data analysis.

12.1. Introduction

Qualitative data, usually in the form of words rather than numbers, are rich in description and explanation of processes (Miles and Huberman, 1994). They help researchers get beyond initial concepts and generate or revise conceptual frameworks. As soon as data collection begins, researchers start to compile different forms of data, from various measures. Most of it comes from interview data (be it open-ended, structured or semi-structured interview), observation data, or special documentation such as photo or video, archival records or diaries.

The data collected are not usually ready to be analyzed. Some preliminary process should be employed prior to analysis. For instance, interview data which has been recorded needs to be transcribed and edited, field notes need to be typed up and completed. In this module, we will discuss data analysis in the form of words, not moving images or pictures, even though data in moving images and pictures (video, photographs) are also common in qualitative research.

12.2. Qualitative Data Analysis

Green and Thorogood (2004) define qualitative data analysis as the process of making sense of data, others describe it as the search of pattern and explanations (Ulin, Robinson and Tolley, 2005), or the process of breaking the data into bits so that researchers can interpret, explain, understand and perhaps even predict (Dey, 1993).

Qualitative data analysis may involve a wide array of perspectives, as one may look at data from a historical or chronological point of view, examining social structures or by comparing cases as well as by asking questions. It should always be conducted in rigorous manner to achieve reliability and validity as required in any health research (Green and Thorogood, 2004). The different and wide perspectives which qualitative study may be related to are the study contexts which are part of participant's context and shape the information provided, either by their social positions, values, religious

convictions or influenced by their physical, social, economic and political environments (Ulin, Robinson and Tolley, 2005).

Qualitative data analysis involves a sequence of interrelated steps as outlined in Figure 12.1. Those steps are reading, coding, displaying, reducing and interpreting (Ulin, Robinson and Tolley, 2005, Miles and Huberman, 1994). Reading requires immersion in data, which means that data needs to be read and reread, and notes are reviewed. As researchers read, they look for emerging themes and begin to attach labels or codes to chunks of text that represent those themes. Once the texts have been coded, each thematic area is explored by displaying the relevant information under the specific categories or themes and reduces this information to its core points. At each step, data is interpreted – searching for meanings – by noting regularities, patterns, explanations, possible configurations and propositions (Miles and Huberman, 1994).

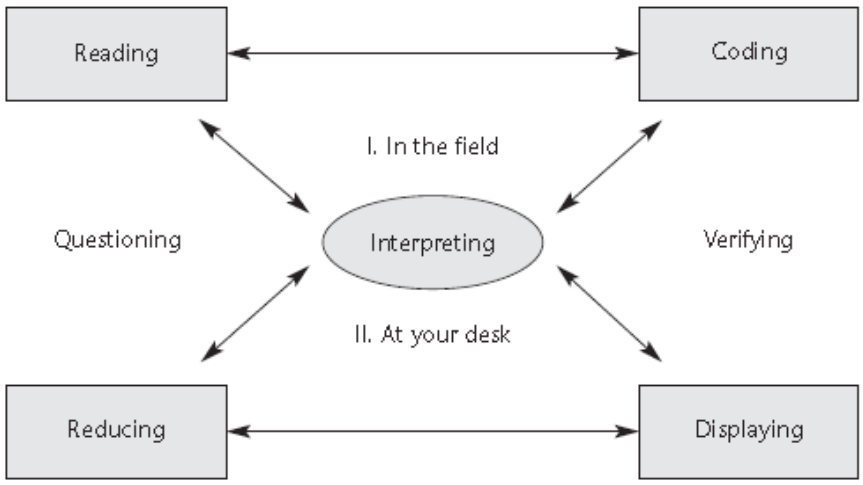


Figure 12.1. The process of data analysis in qualitative study
(Source: Ulin, Robinson and Tolley, 2005)

Data display is considered a major part of qualitative analysis. Qualitative data can be displayed in the form of matrices, graphs, charts and networks. Data display helps researchers to draw conclusions as researchers decide what part to be displayed and how data will be displayed (Miles and Huberman, 1994).

12.3. How to Start Data Analysis

Once data collection is started, novice qualitative researchers may easily get overwhelmed with the pile of data, as data may come from various sources. Data from interviews or discussion records are not easily analyzed. They must be listened, typed up and edited prior to analysis. The process is called *transcribing* which involves detailed writing processes of all recorded data (interview, focus group discussion).

Once the researchers have field notes or transcripts, they should start reviewing the transcripts to identify important themes and patterns in these themes. Questions may arise during this process, which may lead to further analysis or collection of additional data (Ulin, Robinson and Tolley, 2005). To guide the analysis, Miles and

Huberman (1994) recommend using conceptual framework and research questions, while Green and Thorogood (2004) suggest relating analysis with the aims of the study.

a. Transcribing

Transcribing involves detailed writing processes of all recorded data, the process later on yield transcript(s) which will be used for analyzing. How detailed the transcription is, will be determined by the needed of the analysis. For those interested in conversation analysis, a verbatim transcript will be needed. The most important thing that we have to bear in mind when doing transcription is reproducing reliably precise words used by the interviewee, including slang words, stutters, hesitation and interruptions. Transcription should reproduce the actual rather than a tidied-up version. The detail of the transcript affects how it is read by those analyzing it. Green and Thorogood (2004) suggest for ease of use in analyzing, transcription should be printed with wide margins, numbered lines and each new speaker on a new line. The other important thing is that conventions used for transcription are agreed within the transcriber and those who will analyze it. In figure 12.2 is one example of the conversions.

I	Start of each new utterance by interviewer
R (1, 2, 3, etc)	Start of each new utterance by respondents (≠ 1, 2, 3, etc)
?	Beginning of utterance by unidentified speaker
wo-	Word interrupted by next utterance
(word)	Word(s) in round brackets indicate transcriber's guess at an unclear word
CAPITALS	Words spoken more loudly than others
(…)	Indicate unclear material omitted by transcriber
In extracts reported papers and reports:	
[ ]	Square brackets enclose material added by author
…	Indicate material omitted by author

(**Source:** Green and Thorogood, 2004)

Figure 12.2. Suggested transcript conventions.

b. Coding

Coding is the main process of data analysis in qualitative study. Miles and Huberman (1994) define codes as "tags or labels for assigning units of meaning to the descriptive or inferential information complied during a study" (page 56). Ulin, Robinson and Tolley (2005) consider codes are like "street signs" which are inserted in the text to remind researcher about what or where they are. Codes are assigned to specific sentences, paragraphs, chunks of text or part of data to extract its meanings. Coding is part of data reduction as it involves simplifying and extracting the data.

There are no standard guidelines on how to code data. Researchers differ on how the code, when to stop and how detail they want the codes representing the data. Ulin, Robinson and Tolley (2005) suggest to code firstly using a broad label that relate to the research questions, later these codes can be divided into smaller and more specific ones.

Bernard and Ryan (1998) summarizes the strategy for coding written by many qualitative researchers, among others: coding can be done simply by underlining the "key phrases", identifying categories and terms used by informants themselves, or coders can start with some general themes from literature and add more themes as they go.

Step 1: Underline key terms in the text	**Step 2: Restate key phrases**
Social worker, Gp. 3: The professionals are afraid people will be repeating misinformation, that people will compare one diagnosis to another and come back and say, "why aren't we getting XXXX?" There is a fear that they will get people who are obsessed with the disease, and not coping well, and totally fixated in getting the secondary gains from the disease. Frankly, I've seen that happen in a few individual cases.	repeat misinformation compare diagnosis obsession with disease cope poorly fixation on secondary gains
Social worker, Gp. 7: Professionals are afraid that a group could get out of hand, take power or just be harmful in some way.	get out of hand take power be harmful

Figure 12.3. Marginal notes as a coding aid
(**Source:** Chesler, 1987 in Miles and Huberman, 1994)

Level 1 codes (meaning units)	**Level 2 codes (categories)**	**Level 3 codes (theme)**
1. Lack of confidence 2. Lack of knowledge 3. Lack of confidence in the first day 4. Being anxious about starting clinical practice 5. Fear of hospital environment 6. First week anxiety 7. Fear of unknown in the first day	1. Fear of failure 2. Feeling incompetent 3. Feeling under pressure 4. Fear of facing the procedure	1. Initial clinical anxiety

Source: Sharif F and Masoumi S ,2005.

Figure 12.4. Examples of 3 levels of coding

As the process of coding continues, researchers may eventually end up with a list of codes in their hands. Coding schemes or list of codes can be developed by looking through the whole data early to identify the main themes as the researchers perform the coding activities or elements of it can be developed from the research questions (Green and Thorogood, 2004).

c. Approaches to analysis

Green and Thorogood (2004) outlines three common approaches in which most researchers use combination of those in qualitative health research:

- *Thematic analysis*

The most basic type of qualitative analysis is an analysis of the content of the data to categorize the recurrent or common "themes". This is the most common approach used in qualitative research reported in health journals. Thematic analysis is conducted by categorizing informants' answers in data, such as interview notes or transcripts, to summarize the data. It is a comparative process, in which informants answers are compared with each other to identify the common themes and more than simply categorizing and coding the data, but goes to think about how the codes relate to each other and asking more complex questions.

Aronson (1994) explains the pragmatic process of thematic analysis. The first step after interview records are transcribed, patterns of experiences can be listed through direct quotes or paraphrasing the responses. The next step is to identify all data which can be categorized under the already-identified patterns. The third step is to combine all related patterns into sub-themes. Taylor and Bogdan (1984, p.131) define themes as "units derived from patterns such as conversation topics, vocabulary, recurring activities, meanings, feelings, or folk sayings and proverbs". The fourth step is to build a valid argument for choosing the themes. This is done by reading the related literature which allows the researchers to gain information and make inferences from the interviews. Once the themes have been collected and the literature has been studied, the researcher is ready to formulate theme statements and to develop a story line. A story line helps the reader to understand the research.

- *Grounded Theory*

Grounded theory is one of the most influential views of qualitative data analysis. This approach is developed by Barney Glaser and Strauss (Glaser and Strauss, 1967) to "discover theory from data". This an attempt to provide what they call "rules of thumb" to developed theory that was grounded in data (inductive method) compared to the deductive method (theories are tested against data, as in testing hypotheses).

In the effort of developing theory from data, Glaser and Strauss's approach is emphasized on the cycling process of collecting data, analyzing it, developing a provisional coding scheme, using it to suggest further sampling (e.g. who to be interviewed, how many more people are need to be interviewed), more analysis, checking out emerging theory until a point of saturation is reached. Saturation in this term is defined as no new patterns are emerging. Thus, as grounded theory analysis moves from inductive to deductive method of research, back and forward between theory and data, data collection and analysis are carried out together as a cycling process and the research informants are determined along the way.

The first step in grounded theory analysis is intense coding of early data. The term "open coding" is used to describe an intense line-by-line analysis of transcript or field notes. It involves asking questions of "what is going on here" to open up all possibilities and to generate as many codes as possible. Open coding eventually

provides researchers with a long list of codes or concepts, which later on those that appear to carry similar phenomena are grouped together. Other important principles in grounded theory proposed by Glaser and Strauss are the "constant comparative method", the strategy of data interpretation by continuously comparing cases, codes and data sets and the principal of constantly challenge and develop theoretical insight by paying attention to deviant cases and exceptions within data sets.

It should be noted that grounded theory is frequently claimed to be used in qualitative research, yet the researchers used a superficial thematic content analysis (Green and Thorogood, 2004; Heath and Cowley, 2004). Research which uses grounded theory should provide a saturated account of data, rather than only a list of key themes. An appropriate grounded theory research which aims at reaching the theoretical saturation is time consuming and many health researches are constrained with time and funding. However, even if funding and time do not allow researcher to conduct a grounded theory research, many elements of grounded theory analysis is useful to be performed, as it provides researchers with a rigorous way of data analysis.

- *Framework analysis*

Framework analysis was developed by the National Center for Social Research with the purpose of generating policy (Green and Thorogood, 2004). It involves summarizing and classifying data within a thematic framework. The first step of framework analysis is familiarization with the data through re-read field notes and transcripts and listens to tapes. Thematic analysis is the next step of framework analysis. The themes become the labels for codes. Coding in framework analysis is called *indexing*. The last step is *charting*, which involves summarizing cases and themes in a chart, so researchers can see across cases and under themes. The difference between thematic analysis and framework analysis is that the later moves beyond categorizing data into themes. It involves looking at relationships between the codes by using diagrams and tables. This is called *mapping* and *interpretation*. The goal of framework analysis is developing practical strategy for program purposes.

d. Data displays

As part of the analysis, data need to be displayed. Experience tells that extended, unreduced text alone is a weak and cumbersome form of display as information is dispersed over many pages and usually poorly ordered thus monotonously overloading. The idea of display means a visual format that presents information systematically, so the reader can draw valid conclusions and take needed action. Valid analysis requires, and is driven by, displays that are focused enough to permit a viewing of a full data set in the same location, and are engaged systematically to answer the research questions at hand.

Miles and Huberman (1994) categorized data in qualitative research as within case (dealt with single bounded context i.e. a case as in an individual, a setting, a small group, an organization, a site, etc) and cross case (concerned with multiple individual cases as in teachers, taxi drivers, schools, special programs, etc). Thus the displays of these types of data involve the following types:

- Within-case displays: exploring and describing.

    - Partially ordered displays: context chart, checklist matrix, transcript as poem.
    - Time-ordered displays: event listing, event-state network, activity record, decision modeling.
    - Role-ordered displays: role-ordered matrix, role-by-time matrix.
    - Conceptually ordered displays: conceptually cluster matrix, folk taxonomy, and cognitive maps.
- Within-case displays: explaining and predicting.
    - Explanatory effects matrix.
    - Case dynamics matrix.
    - Causal network.
- Cross-case displays: exploring and describing.
    - Partially ordered displays: partially-ordered meta-matrix.
    - Time-ordered displays: time-ordered meta-matrix.
    - Conceptually ordered displays: content-analytic summary table, decision tree modeling.
    - Case-ordered displays: case-ordered descriptive meta-matrix, scatter plot.
- Cross-case displays: ordering and explaining.
    - Case-ordered effects matrix.
    - Case-ordered predictor-outcome matrix.
    - Variable-by-variable matrix.
    - Causal model.

Some of these data displays are sampled in the Appendix.

- *Matrix displays*

Miles and Huberman (1994) argue that matrix construction is normally interesting, easy, and satisfying. Developing the matrices and working them through is a longer process. This process takes a group to do, not a single individual. Interestingly, the group may come up with different matrix designs and different types of data entries. The above terms of data displays offer certain advantages and limitations. This diversity underscores a basic point. There are no fixed canons for constructing a matrix. Rather, matrix construction is a creative – yet systematic – task that furthers your understanding of the substance and meaning of your database, even before you begin entering information.

The following considerations should be examined prior to developing any matrix:

- *Descriptive versus explanatory intent.* Are you essentially trying to lay out data to see "what's there", or do you want to generate some explanations about why things happen as they do? The latter intent usually requires more careful attention to various forms of ordering.
- *Partially ordered versus well-ordered.* Are you essentially placing data in rows and columns that represent descriptive categories, one by one, or are those categories ordered in some ways – by strength or intensity of a variable, by time, by roles of participants, by cases that have different

levels of some key variables? Once past initial description, some form of ordering is typically very helpful.

- *Time-ordered versus not.* Ordering matrices by time is a special case of the above. If a matrix is time-ordered, it enables the analysis of flow, sequences, perhaps cycles and chronologies, and maybe cause and effects.
- *Categories of variables.* Which type of rows and column are possible? The set of possibilities is almost infinite. Once you are clear about the types of rows and columns, you usually must make further partitioning decisions. Say, if you are working with "roles" as columns, are the head nurses – for example – shown separately, lumped with nurses, or with administrators? Are you sorting doctors by specialty and/or by status (head, attending, resident)?
- *Two-way, three-way, N-way*. The simplest matrices, as in quantitative data display, are organized in two dimensions. You have a choice to move to more complexity if the data demand it. Subdividing each column in a parallel fashion permits a "three-way" matrix, even though the data still are displayed in two dimensions. Subdividing rows in the same way permits a four-way analysis. More complexity is always possible, but going further than four-way tables probably means you should be breaking out sub matrices for more clarity.
- *Cell entries*. You always have choices about the level and type of data to be entered.
- *Single-case versus multiple-case data*. Are you focusing on describing/explaining phenomena attached to a single case in context (an individual, a family, a group, and organization etc) or to several cases from which reasonably comparable data have been collected? If the latter, rows or columns will usually have to be devoted to cases.

Counting

In qualitative research, numbers tend to get ignored. After all, the hallmark of qualitative research is that it goes beyond *how much* there is of something to tell us about its essential *qualities*.

However, a lot of counting goes on in the background when judgments of qualities are being made. When we identify a theme or a pattern, we are isolating something that (a) happens a number of times, and (b) consistently happen in a specific way. The "number of times" and "consistency" judgments are based on counting. When we make a generalization, we assemble a group of particulars and decide, almost unconsciously, which particulars are there more often, matter more than others, go together, and so on. When we say something is "important" or "significant" or recurrent", we have come to that estimate, in part, by making counts, comparison, and weights.

So, it important in qualitative research to know (a) that we are sometimes counting, and (b) when it is a good idea to work self-consciously with frequencies, and when it is not. There are three good reasons to resort to numbers:

- to see rapidly what you have in a large batch of data
- to verify a hunch or hypotheses
- to keep yourself analytically honest, protecting against bias

Source: Miles, M. B., & Huberman, A. M, 1994.

12.4. How to Communicate the Results of Your Analysis?

The main product of qualitative research is text – papers, reports, articles, books, and data archives. As researchers, what can we do to make our writing matter and have an impact? What influence do we have over how people will interpret or use the text we have generated? How can we present result convincingly, especially to people who may be more accustomed to understanding issues in quantitative terms? Writing up qualitative data is a process that includes determining whom to address and why, revealing one's point of view in relation to the data, and dealing with special issues of trustworthiness (Ulin, Robinson and Tolley, 2005).

Many researchers new to qualitative methods ask when they should begin writing up research for publication. Because qualitative research generates rich information, determining where to focus one's attention, getting organized, and deciding on the level of detail to be shared is often difficult. How do you know when research is ready for writing? Do you have other considerations – time, money, donor interest, and so on – that may necessitate ending the study and beginning to write?

QHR Editorial: "Data Expressions or Expressing Data"

They say you can find poetry anywhere. One of the latest trends in qualitative inquiry appears to be the transformation of data into poetry or free verse. Block quotations have always been a problem for editors and researchers. In many ways this is a new form of an old dilemma—how do we present rich data in a way that captures the richness? How should we convey the "feel" of what was said or done? Sometimes lengthy quotations extend forever in the results section, with the subjects' voices presenting the analysis, and with minimal commentary from the researcher. Sometimes quotations are used to illustrate the analysis in various forms: raw, as delivered directly from the transcriptionist, with random punctuation; meticulously coded, with each pause measured and every utterance included; or in some cases edited, with extraneous comments culled. But there is a new form emerging: We now find cases in which the author has "converted" the transcript into some form of free verse.

We are not certain why researchers are going to all of this trouble. Is it a response to the pro-art and antiscientific trend in qualitative inquiry? Is it an attempt to be more scholarly? Is it an attempt to avoid the stripping of our data of its richness, or to evoke emotions to new heights? To prove that one can be genuinely interpretive? Or a side effect of the performance side of qualitative inquiry? The editors of *QHR* have considered this trend carefully, and we have made the decision to resist accepting manuscripts of this genre for publication, for the reasons presented below.

First, a practical reason: space. If an article incorporating free verse increases the length of the article by 5 pages, someone else loses 5 pages.

Next, although authors do not share their original transcripts with us, we suspect that transforming data into a "poem-like structure" of some sort changes the form of the data even if it does not change the meaning to any significant degree. If it does change the meaning, we have a validity issue; if it does not change the meaning, then why bother doing it? In our opinion, if there is "value added" in the transformation, we need to know the guidelines and conventions that guided the authors' decisions.

Of greater concern, the presentation of data as verse focuses on the literary device rather than the health research. What happens when good research is presented in the form of bad or mediocre poetry? We have not been convinced by a rigorous argument that such transposition enhances the depth of analysis and richness of findings. Interpretation and analysis ought to be in the realm of theoretical construction and practical import, yet much of this poetic presentation does not even attempt to explain "what this research means" for the practice world.

Source: Morse JM, Coulehan J, Thorne S, Bottorff JL, Cheek J and Kuzel AJ, 2009

Ulin, Robinson and Tolley (2005) conclude that when you have come as close as possible to the point of saturation in your analysis, where additional data are not yielding new insights, you are ready to write. At this point, if you have followed a systematic research process, you should have a full set of files that document your reflections on what you learned. You will also have the following:

- a final list of codes.
- tables, matrices, or other summary devices that identify aspects of concepts you have studied.
- a clear understanding of the thematic structure: how your themes fit together and how they relate to your conceptual framework.

The next step is to define the audience and the type of report format you want to comply with. Once you have determined your audience and the basic format you will follow, find and read samples of excellent writing that address similar audiences. Analyzing styles and formats by other researchers in your field can help you organize your data and insights effectively (Ulin, Robinson and Tolley, 2005).

Finally, the keys to successful qualitative research include the following notions:

- The art of asking "why?".
- The art of listening and being open-minded.
- Research as a creative process of investigation.

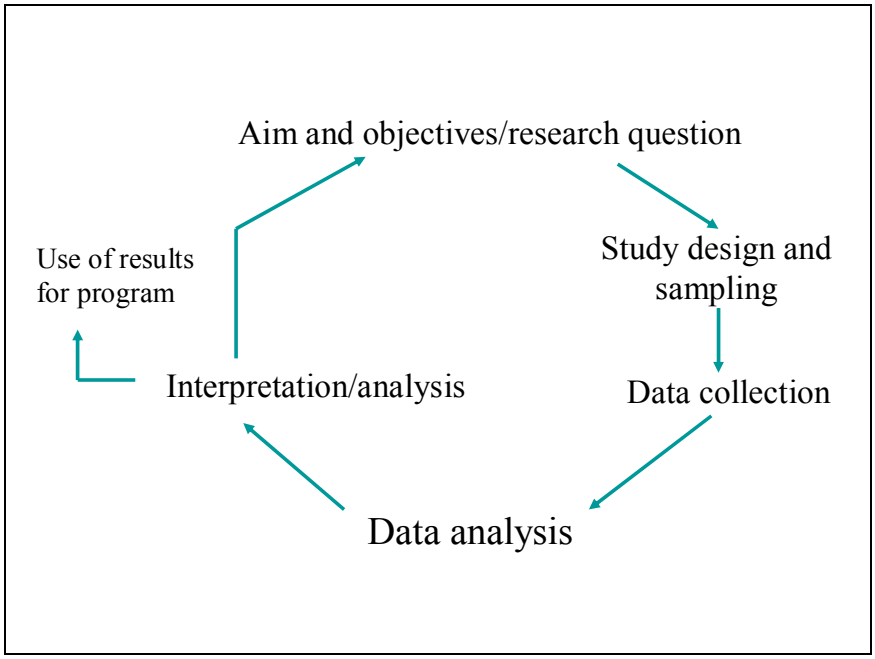


Figure 12.5. Qualitative research requires iterative process of investigation

Triangulation

Concept: Combination of methodologies (methods, sources of data) to investigate the same phenomenon. Miles and Huberman (1994) sort triangulation as a near-talismanic method of conforming findings. Triangulation is supposed to support a finding by showing that independent measures of it agree with it or, at least, do not contradict it.

Purpose of triangulation

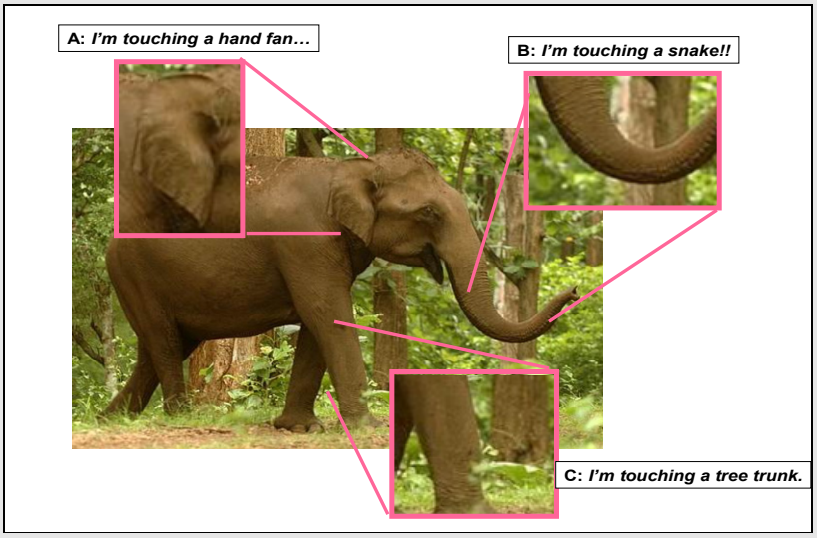
- To cross-validate data? Not necessarily…Social scientists argue that each method provides a different approach to reality, and will reveal different, sometimes conflicting aspects of the phenomenon under investigation.
- Attempts to overcome the subjectivity of qualitative data.
- We may get corroboration; more typically, we can "bracket" the findings, getting something like a confidence interval (Green at al., 1989 in Miles and Huberman, 1994).

Types of triangulation

- Data source triangulation (can be over time, across spaces).
- Investigator triangulation: more than one observer or interviewer involved.
- Methodological triangulation.
- Theory triangulation (rare!).

***Example*:** Understanding the quality of nutrition rehabilitation programs using available records, direct observations, interviews with mothers, program staff, and NGO staff.

Illustration: Are we all seeing an elephant?
Three blind men are touching three different parts of a "structure". When the three of them meet and discuss, they should be able to decide what are actually they are seeing: a hand fan? a snake? a tree trunk? or as close as seeing an elephant?.



12.5. Choosing Computer Programs for Qualitative Data Analysis

a. Software types and functions

The following generic types as noted by Miles and Weitzman (1994) include the first three which were not necessarily developed with the needs of qualitative researchers in mind, and the three others which are qualitative-specific:

- *Word processors.* These tools are basically designed for the production and revision of text, and thus are helpful for taking, transcribing, writing up, or editing field notes, for memoing, for preparing files for coding and analysis, and for writing report text.
- *Word retrievers.* Programs such as Metamorph, Sonar Professional, The Text Collector, and WordCruncher specialize in finding all of the instances of words, phrases, and combinations these in one or several files.
- *Text base managers.* These programs organize text more systematically for search and retrieval. Examples are ask-Sam, FolioVIEWS, MAX, Orbis, and ZyINDEX. Some are able to refer to externally stored documents, pictures, or audio- or videotapes.
- *Code-and-retrieve programs.* Software of this sort – often developed specifically by qualitative researchers – helps to divide text into segments or chunks, attach codes to the chunks, and find and display all instances of coded chunks. Examples are ATLAS/ti, HyperQual, Kwalitan, MAX, NUDIST, QUALPRO, and The Ethnograph.
- *Theory builders.* These programs, too, are often researcher-developed. They usually include code-and-retrieve capabilities, but also allow you to make connections between codes (categories of information). They are often organized around a system of rules, or based on formal logic. Examples are AQUAD, ATLAS/ti, HyperRESEARCH, NUDIST, and QCA.
- *Conceptual network builders.* Software of this sort helps build and test theory, and work with systematically-built graphic networks. Variables can be seen as nodes, linked with other nodes by specific relationship (e.g. "belongs to", "leads to", or "is a kind of"). The networks are not just casually hand-drawn, but are real "semantic networks" that develop from the data and concepts and the relationships among them. Examples are ATLAS/ti, MECA, and SemNet. Programs with strong network-drawing capabilities include Inspiration and MetaDesign.

b. How to choose software

"What is the best program?" According to Miles and Weitzman (1994), there is no one answer. A careful look at the following issues will help to know what to look for in more detail, in relation to specific computer programs.

- What kind of computer user are you?
  - MS-DOS versus Mac user
  - New to computers versus having active interest in the ins and outs of how programs work

- What kind of database and project is it?
  - Data source: single versus multiple. Data may be collected from many sources (for instance: the case is a student, and data are gathered from teachers, parents, friends, and the student herself). This sort will need programs that are good in making links, such as those that have hypertext capability and that attach "source tags" so where the information comes from is easily located.
  - Single versus multiple cases. With multiple cases, you may want to sort them according to different patterns or configurations, or to work with only some of the cases, or do cross-case comparison.
  - Fixed records versus revised. Revision may include adding codes, commentary, memos, corrections, etc. Some programs make database revision easy; others are quite rigid.
  - Structured versus opened as in response to a standard questionnaire versus running field notes or participant observation.
  - Uniform versus diverse entries. Your data may all come from interviews. Or you may have information on the same person or organization of many sorts (documents, observations, pictures, audiotapes, videotapes). Some programs handle diverse data types easily; others are narrow and stern in their requirements. You may need ones with good linking features.
  - Size of database. Estimate your total size and double it. Most programs are more than ample, but you should check.
- What kind of analysis is anticipated?
  - Explanatory versus confirmatory. If the former, look for features of fast search and retrieval, easy coding and revision, along with good graphic display. If the latter, programs with strong theory-building features are better bets.
  - Coding scheme firm at start versus evolving. If the latter, look for on-screen and/or automated coding for easy revision of codes. Hypertext link-making capabilities are helpful too.
  - Multiple versus single coding. Some programs let you assign several different codes to the same segment of text and may let you overlap or nest coded chunks. A few are stern: one chunk, one code.
  - Iterative versus one pass. If the former, look for programs that are flexible, invite repeated runs and can make a log of your work as you go.
  - Fineness of analysis. Will your analysis focus on specific words? Or lines of text? How flexible is it? Look to see what the program permits (or requires or forbids) you to do.
  - Interest in context of data. How much surrounding information do you want to have? Programs vary widely on this.
  - Intentions for displays. Analysis goes much better when you can see organized, compressed information in one place. Some programs are good at different ways of data display.
  - Qualitative only, or numbers included. If your data and/or your analyses include the possibility of number-crunching, check whether the program will count things, and/or whether it can send information to other programs specifically designed for quantitative analysis.

A significant issue is whether you are choosing software just for this project, or for the next few years. Your word processor does not care what you are writing about, so most people pick one and stick with it until something better comes along and they feel motivated to learn it. But qualitative analysis program tend to be good for certain types of analyses. Switching costs time and money.

Summary

Qualitative data, usually in the form of words rather than numbers, are rich in description and explanation of processes. The data collected are not usually ready to be analyzed. Some preliminary process should be employed to the data such as transcribing. Then, the next step of reviewing the transcripts to identify important themes and patterns in these themes can be done.

There are three common approaches for data analyses in which most researchers use combination of those in qualitative health research i.e. thematic, grounded and analysis approach.

Learning Activity 12.1.

Task. Use the transcript below to identify:

1. New informants (theoretical sampling).
2. Further topics to explore (theoretical sensitivity).

Transcript of an In-depth Interview

This is an excerpt from the interview taken in 2001 in Jakarta. The topic was feeding practice of children under three years old.

Background information:

- The informant is a mother, age around 30 years old, she is a housewife and she looked tired but happy at the same time when the researcher came to her house. She graduated from university (economic faculty).
- The informant's house was quite small, full of furniture and kid toys. She was holding her second daughter while we had this conversation.
- The first child : Fina, age 21 months
- The second child: Aina, age 6 months

Now Aina is 6 months old, is there any complementary food given?

When she was 4 months, I gave her milk porridge, but she really eats when she is 6 months, since she is still breastfed she doesn't eat a lot, now she eats milk porridge and rice porridge

So, she starts eating complementary food when she was 4 months?

Yes, I taught her

Before 4 months did you give something to her?

No, I gave exclusive breastfeeding

So, you gave her milk porridge when she was 4 months?

Yes, but not really gave her, I just introduced it to her

Why did you choose milk porridge?

First, it is practical, I ever made my self, but it was too much, there was left over. I did not know the portion. If I buy there is information about the serving portion. Sometimes I also make porridge from rice flour mixed with corn flour, added banana and put a little bit of sugar. I have the menu in a book, sometimes I read it and then I want to make myself

How is your breastfeeding pattern, do you have a schedule or just breastfeed based on baby's demand?

I don't have schedule, there is no exact time, every time she wants it I breastfeed her. Even when I am on the street, any time, when she wakes up I breastfeed her.

Why do you do it like that?

Because I worry that she only drinks breast milk. I am afraid it is not enough. In the beginning I didn't have a lot of breast milk, and then I ate the heart of banana. It was boiled and I ate it to increase the volume of my breast milk. I also eat a lot of vegetables. So I have a lot of breast milk. My first child, Fina, didn't get exclusive breastfeeding

Why not?

First because she is my first child, So I didn't know much about breast milk. Based on my experience with Fina, I don't want that to happen again. I felt that time that my breast milk was thin, now it is thick, very thick. So thank God, it is enough for Aina, sometimes she only eats complementary food once a day.

How old was Fina when you gave her complementary food?

3 months. Because she did not feel full and even worse I got pregnant again. When she was 6 months, I was pregnant my second child. I feel so sorry to her. I also gave formula milk, since she was a baby, but I didn't do that to Aina. Because I am afraid that Fina didn't get enough nutrition, because the breast milk was not plenty, and plus I got pregnant, that's why I gave additional formula milk.

So Aina breastfeeds a lot, how long is it, every time she breastfeeds?

More than half hour every time

How about at night?

Oh, she sleeps well, when she is thirsty she wakes up, she breastfeeds and when she feels full, she will sleep again. During the whole night she wakes up about three times.

So at night she breastfeeds longer than at day time?

Almost the same. She also breastfeeds a lot at day time. But she rarely sleeps in the afternoon, because she plays a lot now. When she feels full she will fall asleep. Because I have no one to help me doing household work, so I often breastfeed her. I also give additional formula milk

Did you give formula milk before she was 4 months old?

In the beginning yes, because I gave birth by surgery and the second time because I have bruises on my nipple. After that she doesn't want formula milk anymore because she already gets breast milk a lot. For Fina, she got formula milk from the beginning, because my breast milk was thin.

At night why do you choose to give breast milk than formula milk?

Because it is practical. I am sleepy….

First reason, she (Aina) doesn't want formula milk, second is for practical reason, so that I don't have to wake up and wash the bottle. When I was pregnant Aina, I was hospitalized for a week, because I was too tired. My mind was stressful thinking of why Fina doesn't want to eat and also thinking of my second pregnancy. But thank God I was OK.

Until when do you plan to breastfeed Aina?

Well, until she doesn't want it anymore. It should be until 2 years, but because we plan to have two children only, so I think she can have it as long as she wants it.

How about Fina, how did she stop breast feeding?

She stopped it by herself. I did not wean her, maybe she didn't feel it was delicious anymore.

References

Aronson J. A Pragmatic View of Thematic Analysis. The Qualitative Report 1994 Volume 2, Number 1, Spring, 1994. Retrieved from (http://www.nova.edu/ssss/QR/BackIssues/QR2-1/aronson.html)

Bernard HR and Ryan GW. Text analysis: qualitative and quantitative methods. In H. R. Bernard (Ed.), Handbook of methods in cultural anthropology. Walnut creek: Altamira Press, 1998.

Dey I. Qualitative data analysis : a user-friendly guide for social scientists. London: Routledge, 1993.

Glaser BG and Strauss AL. The discovery of grounded theory : strategies for qualitative research. Chicago: Aldine, 1967.

Green J and Thorogood N. Qualitative methods for health research. London: SAGE, 2004.

Heath H and Cowley S. Developing a grounded theory approach: comparison of Glaser and Strauss. International journal of nursing studies 2004; 41: 141-150.

Miles MB and Huberman AM. Qualitative data analysis: An expanded sourcebook (2nd ed.). Thousand Oaks, California: Sage Publications, 1994.

Miles MB and Weitzman EA. Choosing computer programs for qualitative data analysis. In Miles MB. and Huberman AM. Qualitative data analysis : an expanded sourcebook (2nd ed.). Thousand Oaks, Calif.: Sage Publications, 1994.

Morse JM, Coulehan J, Thorne S, Bottorff JL, Cheek J and Kuzel AJ. Data Expressions or Expressing Data. Qual Health Res 2009; 19; 1035. DOI: 10.1177/1049732309338719. Accessed on August 5, 2009.

Sharif F and Masoumi S. A qualitative study of nursing student experiences of clinical practice. *BMC Nursing* 2005, 4:6 doi:10.1186/1472-6955-4-6

Ulin PR, Robinson ET, and Tolley EE. Qualitative methods in public health : a field guide for applied research. San Francisco, CA: Jossey-Bass, 2005.

PART 4

APPENDICES

Appendices 1

Foods in ASEAN's Poems and Lyrics

Indonesia

Potong bebek angsa (Indonesia)
Potong bebek angsa
Masak di kuali
Nona minta dansa
Dansa empat kali

Sorong ke kanan sorong ke kiri
Tralalalalalalalalala .. lala

Ampar-ampar pisang (South Kalimantan)
Ampar ampar pisang
Pisangku balum masak
Masak sa biji dihurung bari-bari

Mangga mangga lepong
Patah kayu bengkok
Bengkok dimakan api
Apinya cang curupan
Nang mana batis kutu
Piki-piki jawi

Suwe ora jamu (Central Jawa)
Suwe Ora Jamu
Jamu godong telo
Suwe ora ketemu
Temu pisan gawe gelo

Gundhul-gundhul pacul (Central Jawa)

Gundhul-gundhul pacul cul gembelengan
Nyunggi-nyunggi wakul kul gembelengan
Wakul ngglimpang segane dadi sak latar
Wakul ngglimpang segane dadi sak latar.

Kicir kicir (DKI Jakarta)

Kicir kicir ini lagunya
lagu lama ya tuan dari Jakarta
Saya menyanyi ya tuan memang sengaja
Untuk menghibur menghibur hati yang luka

Burung dara burung merpati
Terbang cepat ya tuan tiada tara
Bilalah kita yah tuan suka menyanyi
Badanlah sehat ya tuan hati gembira
Buah mangga enak rasanya
Simanalagi ya tuan paling ternama
Siapa saya ya tuan rajin bekerja
Pasti menjadi menjadi warga berguna

Malaysia

The ant said (by Ramli Selamat)*
Don't give me sugar anymore
Because now
Tasty meat
Has just arrived
From the battle fields:
The meat of your friends
And brothers!

Singapore

Chopsticks
A pair of chopsticks
Squints at me
My pragmatics teach me
Western convenience
In fork and spoon.
My parents frown at my
Cultural unrespectability
In crossing the chopsticks.
There is etiquette
For handling chopstick
(handling lives).

Suddenly how to handle chopsticks
Involves moral dimension

Philippines

Dinner in Penang (by Jose Y. Dalisay, Jr)*
For the second time in as many days
I come to her, and have the same
Two-ringgit dish of hawker's prawn
Steamed in fragrant broth, and its succulence
Competes in joyfulness with the garlic sauce.

The next morning, Elangovan says to me:
"Those prawns were fatted on the city's slime-
Look here, it's in the papers,
Waterborne diseases on the rise!"
And while my reason grapples
With the sordid possibilities,
My stomach's heart has no regrets,
Having loved, without need of asking,
Having departed more complete, in trusting.

Stroya (by Lina Sagaral Reyes)*
For Grace and Onang

When you teach breastfeeding
To young mothers, I was told,
The obvious rudiments-
Cleaning the nipples, knowing
When the milk goes sour or stale;
The clam soup with lemon grass
And horse radish to keep
The nourishing surge coming-so,
Expect these villagers
To bare and barter other lessons.

I seek nothing vast or vital,
Ready only for something of possible use to me,
Like, how to make easy
Backbreak-stances of shore gleaning
For drift weed or shell a low tide, but

Today Laureana asks if I've heard
Of the news on the radio

How in Paniqui, Bulucan a woma-
Clouds inside her belly swirled,
The eddy of flesh there
Moltened into her first
Child of a mudfish.
Fifteen-year-old Maria dreams

Out loud, I wonder
The ectasy, fishmouth the shape
Of a little star sucking
The lukewarm yellow of colostrums.

Valeria, hawker pf crabs
And fish entrails, would like hers
And angelfish, fins silent
White wings underwater,
Its eyes so full
Of nothing, no clawing screams
To rival her hoarse voice
Braying past the village huts
And by the blacksmith shops.

And laugh Valeria,
We must learn soon new
Tricks to keep away the cats,
Teach ourselves the habit
Of breeding mosquitoes for babyfood,
Find out exactly how fish would smile,
Laughs Valeria the peddler,
Laughing to save
Herself from a near-collision with pain.

My own thoughts ripple rush
Like the water I carry in the puffer fish
Swell of the womb, my oddhearted
Eelchild eager, swimming

In the slow
Ooze of red mud
Toward the rivermouth
Of the vagina

I will name you
Milk.
Or Faith. Or Consuelo,
That tender conquerors' word meaning, comfort.
Or Mistral, after the wind and her
Who wished a fisher's daughter a dreamful
Of fish, leaping and aglow.

You see, it is not difficult to us
To believe
In makebelieve—
Though, of course,
We do not call them makebelieve.

We know they are stories
Villagers dive
Into, far below the reach of the purse seines
Of reason or reality. We keep them simple
And true, these stories
Our lives stir, alive.

Today in this school of mothers,
Nipples darken and rise,
All our dolphin minds
Somersaulting forward.

*__Source__: Asean Committee on culture and information. ASENO: an anthology of poems from Southeast Asia. Manila: ASEAN, 1995.

Appendix 2.

Sample of Questions for Gender-specific Projects

To identify gender-specific impacts and potential for change in gender-mainstreaming projects, questions regarding the following three central components are essential:

- living conditions of women and men in rural areas.
- gender-specific division of labor.
- access to and control of resources.

1. Living condition

1.1. Infrastructure

- What infrastructure does the village offer in terms of streets, supply sources, and school and health systems?
- What relevance for women, men, children and youths (girls/boys) do these aspects have:
    - distance to markets, offices, savings banks, mills, etc.,
    - existence of public transportation,
    - existence of schools and training centers,
    - drinking water supply,
    - hospital, pharmacy, midwife, etc.,
    - accessibility of streets and school and health facilities during the rainy season.

1.2. Village development

- Which organizations have intervened or are doing so at village level and what have they accomplished?
    - results of the work of government organizations, NGOs, international donors.
- In which direction is the trend of the village (advance or decline)?
    - population size and age structure, literacy rate,
    - temporary/permanent migration,
    - number of women heading households,
    - agricultural operating funds available,
    - access to non-agricultural income sources
      (*data for each item should be gender-specifically gathered).*

1.3. Roles and social power of village authorities

- How is the influence of traditional/modern village authorities to be assessed?
    - projects for which approval of certain authorities is sought
    - projects that have failed for lack of approval,

  - bans/taboos for certain groups of people, observance of which is monitored by the authorities,
  - capacity for conflict management.
- What conflicts were successfully/unsuccessfully dealt with in the past by the inhabitants of the village?
  - number and nature of conflicts on the village level,
  - causes of success/failure of conflict management,
  - relation to neighboring villages.

1.4. Cultural rules

- What rules govern the way women and men live together within different cultural, religious and/or ethnic communities and how they live with other groups?
  - customs and traditions.
  - precepts.
  - bans, taboos.

There may be very complex and complicated relationships in these areas. For this reason, researchers should attempt to begin the analysis as directly as possible with their own area of inquiry, but at the same time should not close their eyes to apparently insignificant or remote aspects.

1.5. Mobility of family members

- How great is the mobility of individual family members?
  - men and women (differentiated by head and junior wives; age and occupation),
  - activities of children and young people (boys/girls).
- How is the family structured?
  - number and distribution of births among head and junior wives.

1.6. Status of women and men in the family

- How prosperous/poor is the family, and how does this affect women and men?
  - indicators of prosperity (cattle, housing, consumer goods, etc.),
  - savings, debts.
- How is family property and income distributed between women and men?

In this connection, an appropriate method adopted from the toolbox of participatory extension approaches is *welfare ranking*. By this method, using indicators set by the target group, differences between the financial circumstances of family members or village inhabitants are determined. The result, in the form of a relative social stratification, can make a valuable contribution to, among other things, target group identification.

1.7. Family structures and their impacts on women and men

- What mechanisms promote cohesion of the family/the break-up of formerly stable family structures?
    - economic insecurity.
    - migration.
    - value shifts (large or small family; proportion of arranged marriages, etc.)
    - marriage age.
    - divorce rate.
    - proportion of women as heads of household.
    - proportion of men and women living alone.

2. Division of labor

For practical project work, information about who performs what tasks is needed for two reasons: first, it serves to identify the target group for project activities and, second, information about gender division of labor provides important indicators for determining the specific impacts that project activities have on women and men.

2.1. Division of labor within the family

- Who does what tasks as they come up?
    - women.
    - men.
    - children and young people (boys/girls).
- Does work occur within or outside the family?
- On what terms are these tasks done?
    - without pay.
    - payment in cash/kind.
    - work done in exchange for work.
- How is each activity organized?
    - individually.
    - collectively.

2.2. Income-producing activities

- By what activities is income earned locally/in the (project) region?
    - by women.
    - by men *(differentiated by age, class and ethnicity).*
- By what activities is income earned outside the immediate locality/the project region?
    - income from entrepreneurial activities in agriculture.
    - income from leasing.
    - income from wage labor.
    - income from non-agricultural activities.
    - proportion agricultural/non-agricultural income.
    - proportion cash/barter income.
    - proportion migratory work income (temporary/permanent migration).

    - income earning period (all year/seasonal).
- What unpaid activities are done by women and men locally?
    - agricultural activities.
    - household activities.
    - honorary activities (village health care, associations, etc.)

2.3. Duration of division of labor

- What is the overall burden, in terms of time, on women and men?
- What is the daily routine of women, men and children?
    - differentiated by season
- How are the individual tasks of women and men distributed over the day/the year?
    - working hours per year.
    - working hours per month/season (rainy season or dry season).
    - working hours per day.
- How much travel time (with and without burdens) do women and men put in daily/over the year?
    - travel time.
- How much time does the project require from women and men?
- How much time can women realistically afford for certain project activities in view of their usually tight time-schedules?
- In what way can the project help to reduce demands on time, especially for women?
- At what times of day, week and year should project activities (continuing education, etc.) take place which specifically address women and/or men?

Work calendars can be drawn up as a useful instrument out of the "toolbox" of participatory methods for the study of gender-specific differences in the amount and division of labor. In this process, women and men themselves record the activities they engage in and compare the times required over the course of the year in order to determine peak workloads.

The following example of a work calendar was drawn up at the suggestion of the project by woman farmers in Burkina Faso. Discussions building on the basis of such a work calendar can make a relevant contribution to project design. Specifically, the following issues can be discussed:

- What has changed regarding activities in comparison to earlier?
- How have demands on time developed?
- Is a growing workload accompanied by growing prosperity?
- What strategies have women developed concerning the division of labor with their men?

Women's tasks month-by-month

January	Small-scale trade, spin cotton, brew dolo (a local beer) and prepare meals for traditional festivals and funerals, travel to traditional ceremonies, funerals and marriages
February	Small-scale trade, spin cotton, attend funerals, marriages
March	Collect stones to build bunds, transport manure to the fields, spin cotton, pan for gold, small-scale trade, cut firewood to provide for the rainy season, gather and bale straw, winnow and store millet
April	Small-scale trade, spin cotton, collect stones to build bunds, spread manure, cut firewood, gather straw, winnow and store millet, pan for gold
May	Clear scrub from fields, ted straw and silage, build bunds, cut firewood, spin cotton, small-scale trade, sort seeds, shell peanuts, sow seed if there is rainfall
June	Clear scrub, sort seed, shell peanuts, sow seed, plough
July	Sow seed, plough, weed
August	Ridge, thin out, transplant, weed and harvest corn
September	Search for leaves for sauces (sorrel, "boulvanka"), dry leaves, gather beans, harvest peas, peanuts and corn and shuck corn, harvest gombo
October	Search for and dry leaves, gather beans, harvest gombo, peas, peanuts, harvest millet
November	Harvest millet, dry and store harvested peanuts, gather beans, harvest sorrel seeds, harvest sesame
December	Stockpile grain in stores, prepare germinated millet for dolo used at traditional ceremonies, spin cotton, small-scale trade

3. Access to and control over resources

3.1. Access to material resources and services

Introduction of new processing methods in the post-harvest sector (e.g., manufacture of new products or increase in output through technical innovation) raises various questions:

- Who has control over the resources needed to do the work?
    - land, water, machinery/implements, drying and storage facilities, labor force, know-how
- Who finances the necessary machinery?
- Who controls the means of transportation?
- Who builds storehouses for temporary or final storage?
- Who develops markets?

- Who decides the conditions under which resources are committed?
    - time.
    - place.
    - costs.

On the project level it is important to examine gender-specific differences with regard to access to resources, in order to orient project design accordingly.

Regarding access to services, the relationship between the project and government extension personnel, mostly men, on the one side, and the women within the target group, on the other, is not always free of problems. Relations between these two groups are, as a rule, marked by a mutual lack of acceptance, as well as by too little consideration for the specific needs of women, etc., on the part of the project and extension staff. On the project level, the following should be clarified:

- What extension services are requested by women /men?
- What extension services are offered for women /men?
- What access is there to extension services?
    - extension staff (men/women).
    - extension approach.
    - target group.
    - frequency.
    - costs.
    - results.

3.2. Individual and collective strategies for resource allocation

Generally, however, great interest is to be found among women in "projects for women's groups." Often this is because they cannot bear investment costs alone and therefore put up with collective activities which they themselves do not favor, but which the financiers want. On the project level, it would be worthwhile considering models that would make it possible for women to finance investments at the same time for individual businesses through group loans. Granting credit to individuals should also be possible, basically. The following questions need to be answered:

- What possibilities are offered for men and women to save?
    - separate savings and loan associations for men and women, respectively.
    - banks.
- How is access to credit regulated?
    - creditor.
    - amount of credit.
    - duration.
    - interest.
    - surety.
- What individual/collective strategies are available? In case collective strategies are relevant:
    - goals of existing collectives (procurement of loans/subsidies, competitive advantages).
    - history of origin (voluntary, forced).
    - financing..

- group dynamics.
- efficiency (particularly relative to individual solutions).

- How can each of these strategies be supported?

3.3. Men's right to dispose of women's property

- How is the product used?
  - proportion for own use.
  - proportion for marketing.
- Who decides the use of goods produced?
- Who receives the related income?
- Who decides how the income will be used?
  - full/limited right of disposal.

3.4. Ownership of property upon termination of marriage

When a marriage is ended through death or divorce, women often lose access to and control over important material resources (land, money), services (use of their children as labor force) and produced goods (harvest, etc.) To take this into account in designing the project, it is important to clarify:

- What are the consequences of the death of a spouse/a divorce?
  - inheritance law.
  - costs of burial, divorce.
  - access to and control over resources.
  - property situation.

Source: Günther D and Zimprich E. Gender-orientation in the post-harvest sector: Pointers for identifying gender-specific aspects in the post-harvest sector. Eschborn, Germany: GTZ, 1998

Appendix 3.

Sample of Data Displays

Example of matrix display

Checklist Matrix: Conditions Supporting Preparedness at Smithson School, Banestown Case

	Presence of Supporting Conditions	
CONDITION	FOR USERS	FOR ADMINISTRATORS
Commitment	Strong - "wanted to make it work."	Weak at building level. Prime movers in central office committed; others not.
Understanding	"Basic" ("felt I could do it, but I just wasn't sure how.") for teacher. Absent for aide ("didn't understand how we were going to get all this.")	Absent at building level and among staff. Basic for 2 prime movers ("got all the help we needed from developer.") Absent for other central office staff.
Materials	Inadequate: ordered late, puzzling ("different from anything I ever used"), discarded.	N.A.
Front-end training	"Sketchy" for teacher ("it all happened so quickly"); no demo class. None for aide: ("totally unprepared.. I had to learn along with the children.")	Prime movers in central office had training at developer site; none for others.
Skills	Weak-adequate for teacher. "None" for aide.	One prime mover (Robeson) skilled in substance; others unskilled.
Ongoing inservice	None, except for monthly committee meeting; no substitute funds.	None
Planning, coordination time	None: both users on other tasks during day; lab tightly scheduled, no free time.	None
Provisions for debugging	None systematized; spontaneous work done by users during summer.	None
School admin. support	Adequate	N.A.
Central admin. support	Very strong on part of prime movers.	Building admin. only acting on basis of central office commitment.
Relevant prior experience	Strong and useful in both cases: had done individualized instruction, worked with low achievers. But aide no diagnostic experience.	Present and useful in central office, esp. Robeson (specialist).

Example of descriptive display

Excerpt From a Transcript as Poem
(Richardson, 1992)

LOUISA MAY'S STORY OF HER LIFE

i

The most important thing
to say is that
I grew up in the South.
Being Southern shapes
aspirations shapes
what you think you are
and what you think you're going to be.

(When I hear myself, my Ladybird
kind of accent on tape, I think, OH Lord.
You're from Tennessee.)

No one ever suggested to me
that anything
might happen *with* my life.

I grew up poor in a rented house
in a very normal sort of way
on a very normal sort of street
with some nice middle-class friends

(Some still to this day)

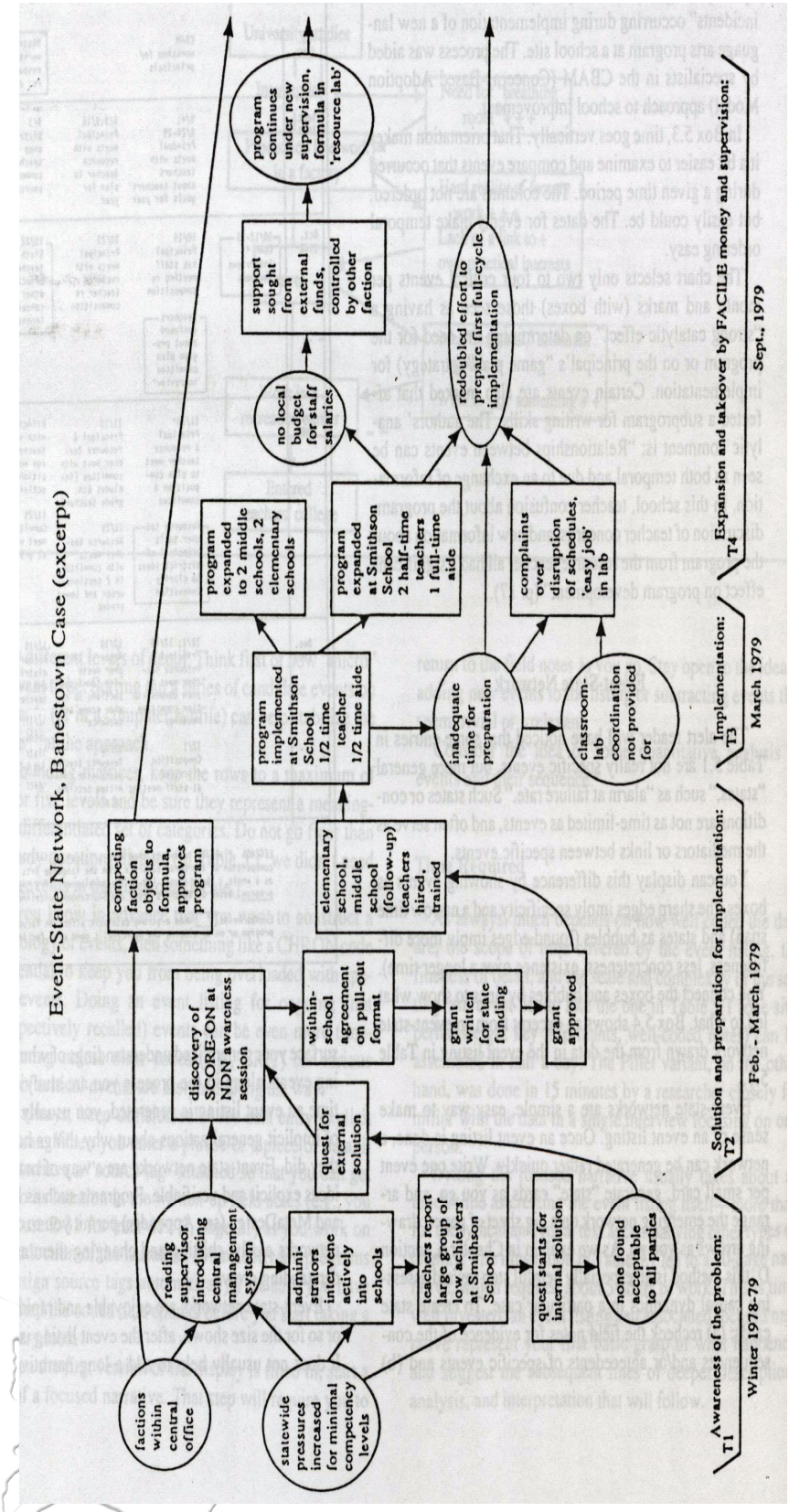
and so I thought I'd have a lot of children.

I lived outside.

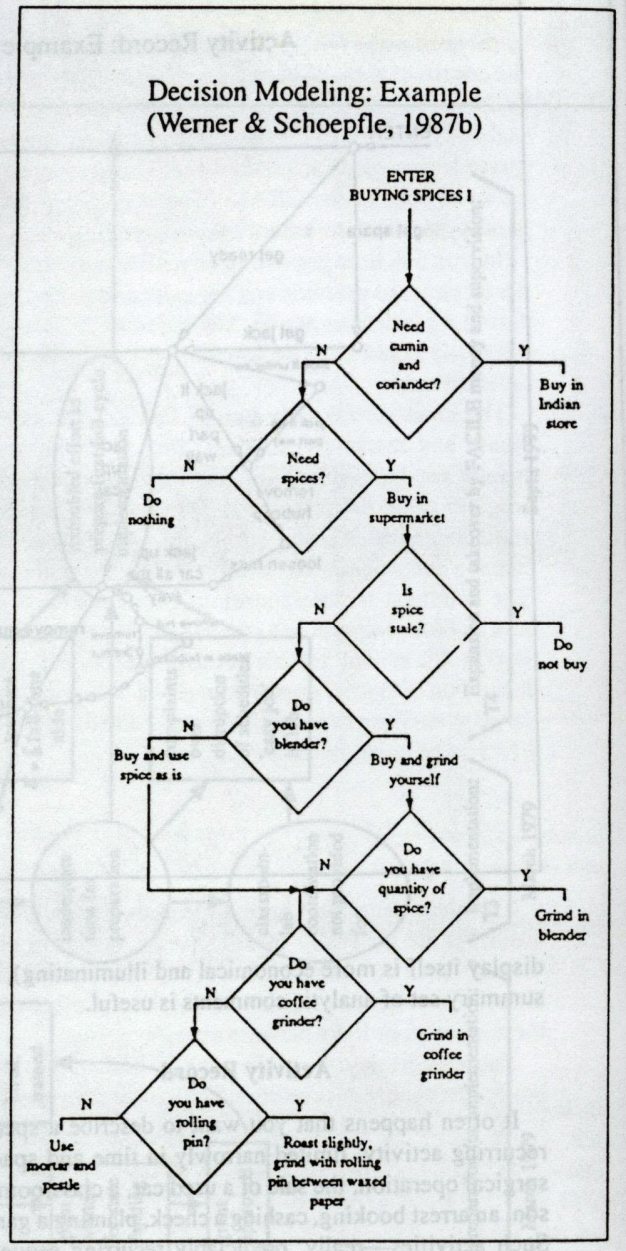
Unhappy home. Stable family, till it fell apart.
The first divorce in Milfrount County.

So, that's how that was worked out.

Example of network display



Example of decision tree display



Example of role-ordered display

Role-Ordered Matrix: First Reactions to the Innovation

		SALIENT CHARACTERISTICS	SIZUP	ANTICIPATED CLASSROOM OR ORGANIZATIONAL CHANGES @	FIT WITH PREVIOUS STYLE OR ORGANIZATIONAL SETTING @@
TEACHERS	+ REILLY 4th year	Highly structured	Little latitude	DK-1	DK-3
	+ KENNEDY 4th year	Frightening format Overload of objectives Reams of handouts	Difficult, complicated No latitude	Teaming (loss of independence) No Scope Magazine use	Poor; user felt she would be locked into structure and others' schedules
	+ FARR 1st year	Skill-oriented, organized Activities well planned Pre- & post testing good	Simple, clear Easy to use & understand	Less freedom to change direction	Fairly good; user views self as structured, organized
	+ ROGERS 2nd year	Prescriptive Rigid	Confusing Simplistic content	Working with basic students for 1st time	Composition assignments fit well; grammar, etc. simple-minded
	+ FLEMING 4th year	Prescriptive Use of media Teaming Heavy monitoring	Many materials Very complex, not quite clear	Working w/ other T's Mastering all materials	DK-2
	* BENNING 1st year	Objectives too broad Good content	Similar to prev. school's program, easy to use	Break down objectives Add games, activities Give objectives to kids	Close fit, when anticipated changes made
	* THATCHER 2nd year	(wrote science curriculum) Skill-oriented Reading emphasis	Too detailed	DK-1	Fair; reading was new; fewer labs
	# WOJICK 1st year	Variety of modes (workbooks, worksheets, computer terminals)	Easy to use; level & format right	DK-1	DK-2
	# MUSKIE 2nd year	Computer terminals Short worksheets	1st 1/2 flawed; 2nd 1/2 on target Good variety	DK-1	DK-1
DEPT. CHAIRS	VAN RUNKEL Science Chrmn	Science content revision Reading reinforcement Flexibility in activities	Questioned content reorg'n--would it fit together?	None -- same teachers, using new curriculum	Good fit: Program replaced old curriculum
	MANNHOELLER English Chrmn	Orderly curriculum w/ horizontal, vertical org'n Reinforcement of 3 strands	Concept is right Depends on its being used as set up	DK-1	Good fit: Program designed in part to fill basic English course slot
PRINCIPAL	MCCARTHY Tindale East	DK-2	DK-2	DK-2	Good fit: Order is maintained; no special requirements
CENTRAL OFFICE	CROWDEN Dir of Curriculum	3 strands of level I Sequential, comprehensive Reinforcement	Works if followed Any teacher can use successfully	None -- program designed to fit structure	Close fit: same staff, teachers wrote curriculum, same auth. structure
	MANN Superintendent	DK-2	DK-2	DK-1	Good fit: Program is a successful curriculum revision effort in district

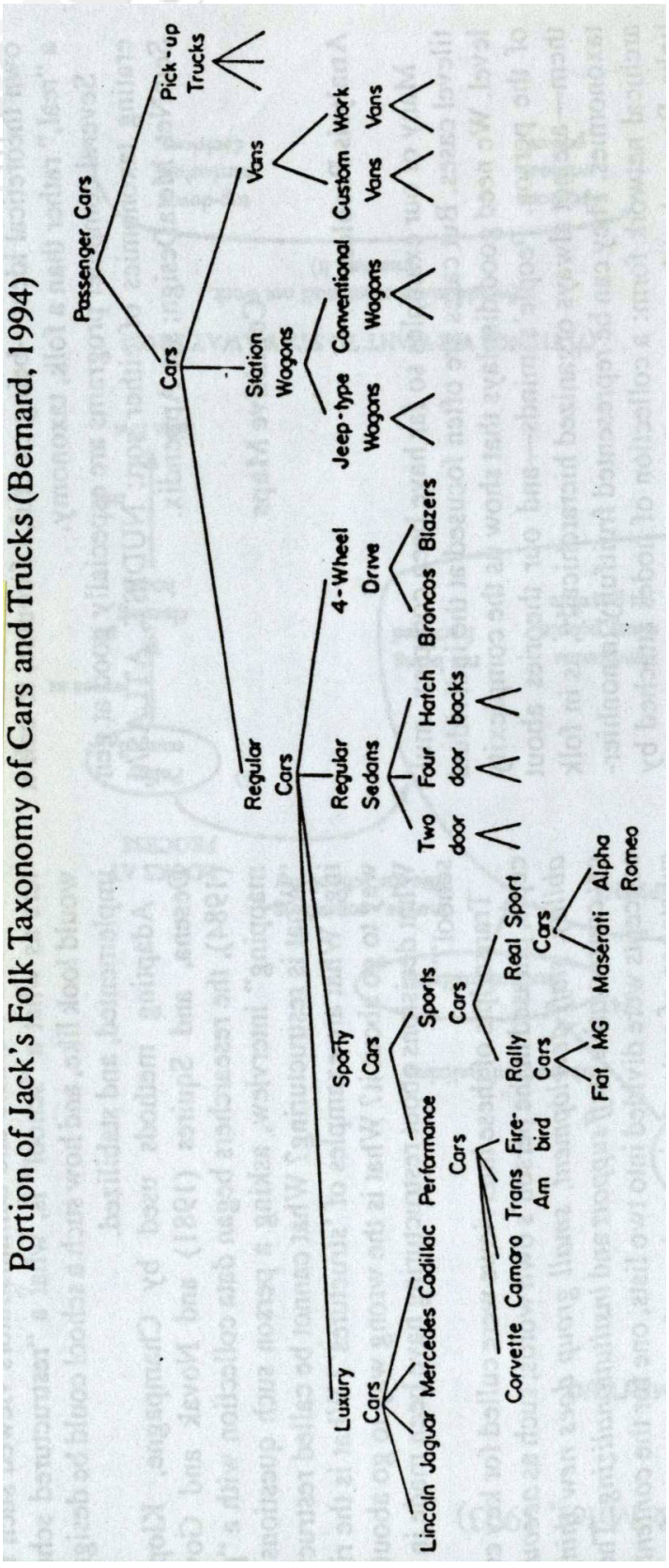
\+ = English teacher
* = science teacher
\# = math teacher

DK = Don't know
DK-1 = question not asked of informant
DK-2 = asked, but not answered (strayed from question, didn't know answer)
DK-3 = ambiguous answer

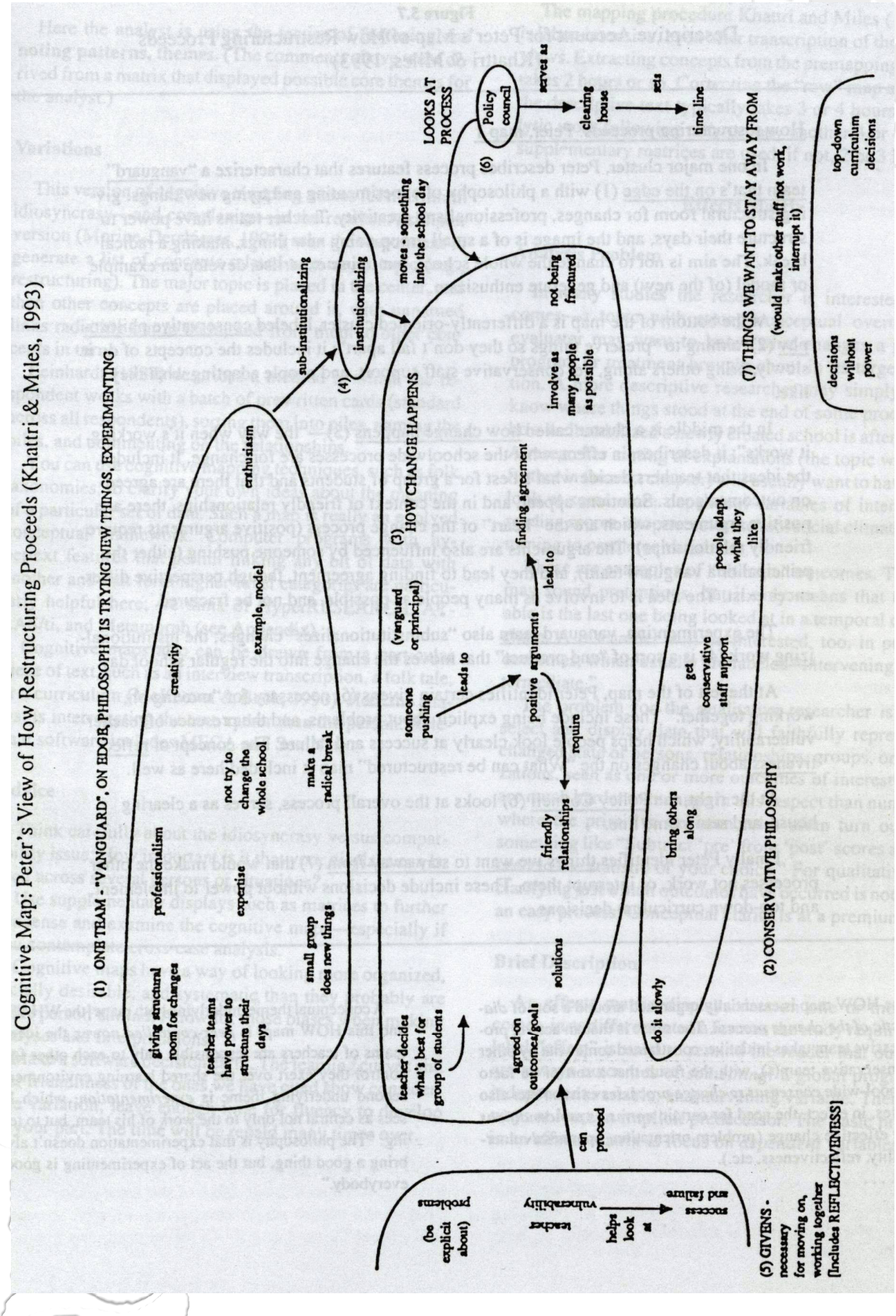
@ Classroom changes question asked of teachers; organizational one asked of others.

@@ Personal style fit question asked of teachers; organizational fit question asked of others.

Example of taxonomy display



Example of cognitive map display



Example of case-level display

Case-Level Display for Partially Ordered Meta-Matrix:
Users' Second Year of Implementation at Lido

User	Feelings/ Concerns	How Innovation Looked	What Was User Doing Most?	Problems
Vance	More comfortable with style of teaching and with having kids outside	Still useful, giving good direction & helpful ideas, activities	Working through materials Giving, participating in env'l educ workshops Working with community Off-campus site work	Time too limited for tasks to be done
Drew	Concern with growing number of non-achievers in forestry/ecology class	Too discovery-oriented for kids without biology basics; lecture style more appropriate	Adapting materials & lessons to growing non-achiever population Off-campus site work	Dealing with more non-achievers successfully
Carroll	Excitement with new activities, expanding science program	Same as first year	Working with community Giving, participating in env'l educ workshops Off-campus site work	Over-extended activity commitment

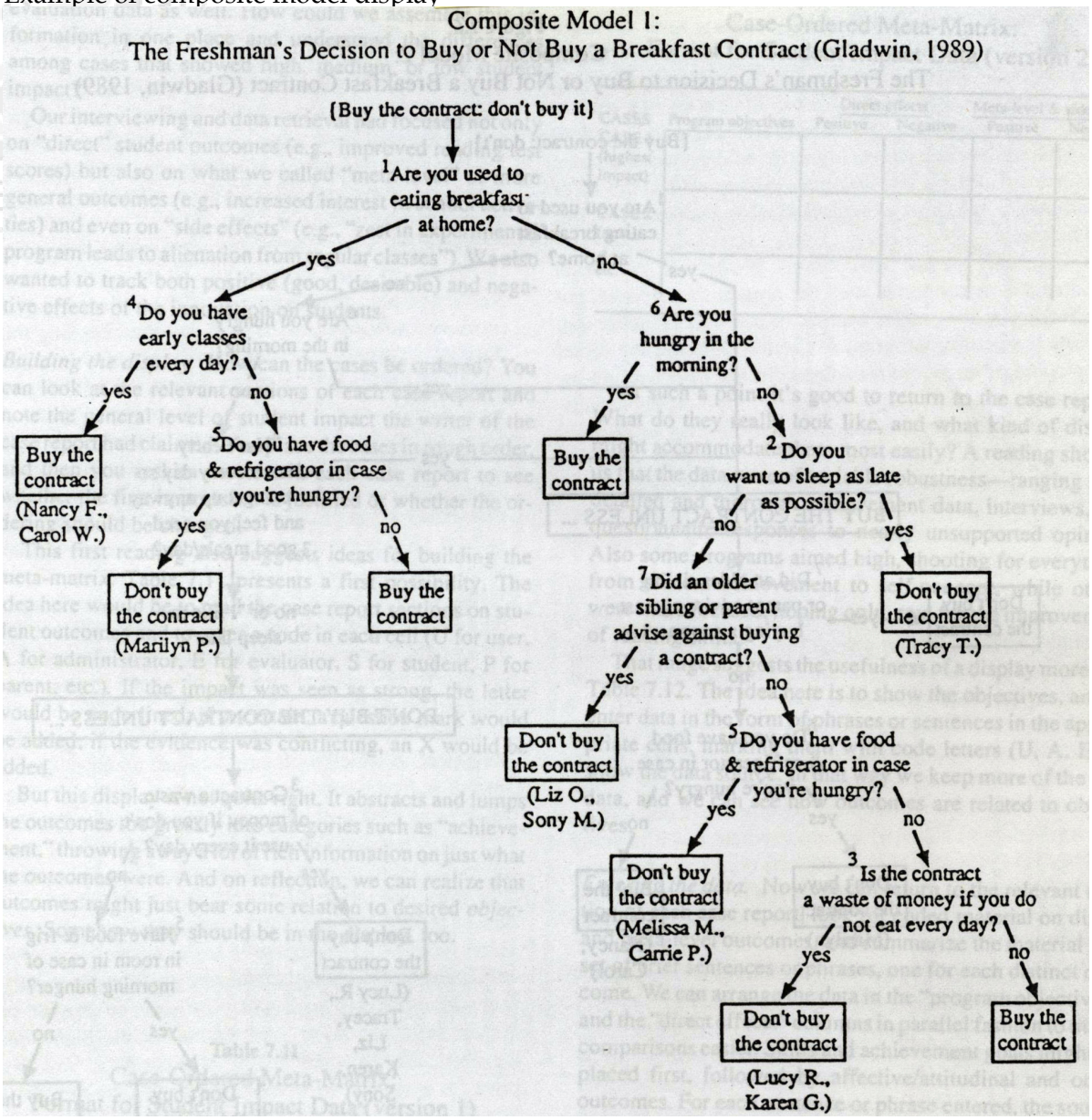
Example of content-analytic summary table display

Content-Analytic Summary Table: The Content of Organization Changes

Type of Change	TRANSITORY CHANGES: Within the innovation	TRANSITORY CHANGES: In the organization	DURABLE CHANGES: Within the innovation	DURABLE CHANGES: In the organization
Structure	Addition of project directors Evolving departments Creation and dropping of advisory committee	Change in locus of control, funding, and supervision	Shift in student input (5) Reorganization: more department interdependence Advisory committee Team teaching	Innovation itself (5): remedial lab, alt. school work experience program, English curriculum, accountability system None (5) Scheduling (4) Expansion of innovation to new users (3) Space for program (2) Creation of coordinator role Creation of management committee Creation of in-service committee Summer-school version of program added Increased team teaching Creation of helping teacher role
Procedures	Active, coercive student recruiting Leadership providing support (emotional, material) Leader "consultation" with teachers Non-users help users with testing Aides, parents help with instruction Increased community contact	Innovation lapsed, is discontinued Field testing of materials Teachers exchange books Other instruction displaced	Tighter supervision, control (2) Student "batching" Routinization of forms/procedures Charismatic leader more distant Fewer staff meetings Reduced student time in program Staff reassignment Selective use of materials	Innovation itself (5): pupil screening, referral/intake, teaming, pullout procedures More paperwork (2) Added student transportation (2) Teacher load reduction Freeing time: substitutes, early dismissal Dropping letter grades More coordination among teachers More teacher discussion of individual students Loss of teacher control over student assignment
Climate	Conflict (4): in teams between users, users-aides, departments More cohesiveness (2), pioneer spirit, esprit User resentment (2) Tension, fear, mistrust	User-non-user conflict (2) User resentment of remedial lab Ambiguity about management committee Expectations for more upward influence, violated, lower morale Resistance by principals, then support	Discouragement, burnout, loss of interest (3) Collaborative, help-giving climate (2) Cohesiveness (2) Less cohesiveness Overload Development of friendships/enmities	Resentment re. paperwork (2) Wariness about innovation More openness to innovation Norm change: flexibility, colleagueship, el.-sec. interaction None: climate still good None: climate still bad More administrative awareness of the innovation

*Each item represents a change occurring at one site. Changes occurring in more than one site have numbers appended.

Example of composite model display



Example of case-ordered descriptive meta-matrix display

Case-Ordered Descriptive Meta-Matrix (excerpt):
Program Objectives and Student Impact (direct, meta-level, and side effects)

CASES	Program objectives	Direct outcome		Meta-level outcomes and side effects	
		Positive	Negative	Positive	Negative
High Impact					
Perry-Parkdale (E)	Basic skills (reading, math, communication, etc.) Life skills (critical thinking, citizenship) Life competencies (credit, health, etc.) Job-finding skills Entry-level work skills, career training Decision-making skills Self-responsibility and initiative Matching interests/ abilities to job information Understanding of others Know socioeconomic trends: career knowledge Sex role awareness Better parent-child communication	Same or better on basic skills scores U. better math (12th grade girls) E P Specific job skills S E P U Career planning and choice: aids goalless Job exploration attitudes positive E How interests fit jobs, what to look for in job E: identity, explore career options C Δ Experience with world of work: headstart C U S Career, occupational knowledge E Preparation for real world of work Experience in working with adults: P communicating with them better U	Less exposure to academic courses C	Personal development, identity, U E P Better communication with adults U S Self-confidence U E P S Increased attendance U Responsibility, motivation U C E P Staying in school (lower-level students) C Δ U Help goalless students A Improved peer relations U Getting permanent job S Parent-child communication P	Some students "get lost" again after a while U Some bide time, don't "deliver" U Program more effective with girls U Alienation from regular school activities C Δ S Irresponsibility, "can't handle freedom" P U
Muespa (E)	Improvement in full range of language arts skills (see at right) More on-task behavior Improved discipline	Increased skills: vocabulary U A P, spelling U A, phonetics Ux, punctuation U, reading comprehension Ux E, reading decoding U. grammar U, written expression U Low achievers more productive Ux	Retention levels not good U Too little diversity Student fatigue U	Concentration, study skills Fewer discipline problems U A More attentive to errors U Better academic self-concept U More enjoyment, enthusiasm U A Work with less supervision, more responsible A U Less time lost, more time on task U A E Rapid students progress faster E	Some lagging, failing mastery tests U Boredom U
Moderate Impact					
Carson (L)	Increased achievement Clearer career interests Friendliness Improved self-concept as a learner More internal locus of control	Career knowledge U A C Work on new interests U		Achievement composite (use of resources) E Better classroom attitude U Attitude to school E U Self-concept as learner (HS) F Friendliness E Social studies (elem) Self-understanding E	Little effect on achievement U
Calston (E)	Basic reading skills, plus use of reading as tool for learning: literature appreciation: reading for enjoyment	Increased criterion referenced test scores A U More reading skills Ux		Learning to work independently self-managing U A Self-motivation A: children like independent work U Children proud to come to school A Children not competing A Reduced discipline problems A	
Moderate to low Impact					
Dun Hollow (L)	Eliminate stereotyping of Eskimos Knowledge of Eskimo history, customs, current life Create positive image of Eskimo culture	Some learning of culture, reduction of stereotypes U A More reading skills Ux	Information too detailed U		Some students behind in language arts U
Low Impact					
Burton (E)	Knowledge & practical skills re political/ government/legal processes (voter education, state government, individual rights)	Concept learning, by being in different roles U Experience in active learning approach A	No effects discernible U		

Legend for sources of data: U = User, A = administrator, C = counselor, P = parent, E = evaluator, S = student
Underlined letters refer to mention by at least two persons
x = presence of dissenting or conflicting opinion
(E) externally-developed innovation
(L) locally developed innovation

Example of case-ordered descriptive meta-matrix display

Case-Ordered Descriptive Meta-Matrix, Next-Step Version (excerpt):
Program Objectives and Student Impact

SITES High impact	Achievement of objectives no.	rating	Comments	OVER-ALL RATINGS OF OUTCOMES # Direct outcomes: Program-immediate	Transfer	Other outcomes: Meta	Negative
Perry-Parkdale * (E)	1	●	math only				
	2	○	fuzzy objective				
	3	◉					
	4	●					
	5	●					
	6	●					
	7	◉	less well for girls	●	◉	●	◉
	8	●					
	9	○	indirect evidence for some aspects				
	10	●					
	11	○					
	12	◎	only 1 respondent				
Masepa * (E)	1	●	low retention for a few	●	●	●	◉
	2	●	boredom for a few				
	3	●					
	4	●					
Moderate impact							
Carson * (L)	1	◎	1 respondent, some counter-indices	◉	◉	●	○
	2	●					
	3	●					
	4	◉	high school only				
	5	●					
Calston * (E)	1	●		●	○	●	○
	2	◎	conflicting assessments				
	3	○					
Moderate/low impact							
Dun Hollow (L)	1	●	reduction, not elimination	●/○	○	○	◉
	2	◎	1 respondent, global claim				
	3	○					
Low impact							
Burton (E)	1	○	reduction, not elimination	○	N/A	○	○
	2	○	1 respondent, global claim				

* robust evidence (external evaluator and/or standardized test scores)

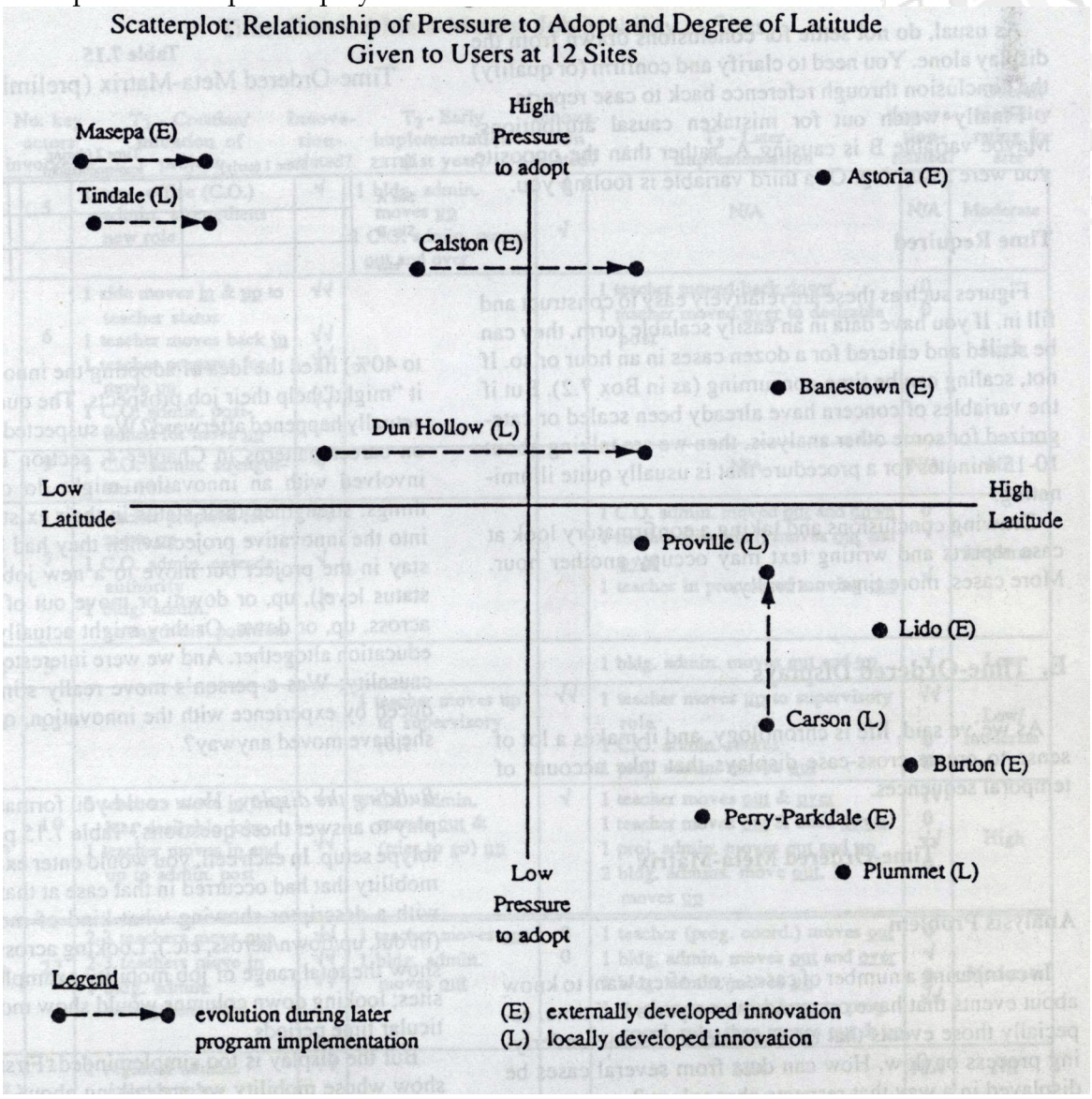
● strongly present
◉ partly present
◎ weakly present
○ absent

uses modal rating of achievement within site's objectives of this type

N/A not applicable

(E) externally developed innovation
(L) locally developed innovation

Example of scatterplot display



Example of case-ordered predictor-outcome matrix display

Case-Ordered Predictor-Outcome Matrix:
Factors Contributing to Parent Involvement (Lee, Kessling, & Melaragno, 1981, p. B48)

	No DAC	No Involvement							Minor Involvement					Major Involvement		
	Mt. View	Roller	King Edward	Brisbane	Benjamin Co.	Maple	Summer Place	Meadow-lands	Plains	Stadium	Bonnet Co.	Kings-town	Cleve-ville	Redlands	Compass	Johns Co.
State Guidelines Exist, Are Implemented			√					√			√	√		√	√	√
DAC Has Specified Authority														√	√	√
Parent Coordinator Role	○	○	◑	○	○	○	○	●	●	◑	◑	●	◑	●	●	●
Staff Attitude: Parental Involvement = Support	√	√	√	√	√			√			√	√				
Parent Attitude: Satisfied with Project/ Professional Make Decisions	√			√	√	√	√	√				√	√			
Decisions Reserved for High-Level Administrators		√	√			√			√			√	√			
DAC Training		◨	◨	□	□	◨	□	□	■	■	◨	□	□	■+	■	■+
Powerful Person		△	△	△	△	△	△		◭	△	◭	△	△	◭	◭	◭

○ = no PC ● = PC dominates DAC ◑ = PC supports DAC

□ = none ◨ = Title I ■ = group processes ■+ = group process + Title I

△ = professional ◭ = shared, parent and professional ◭ = parent

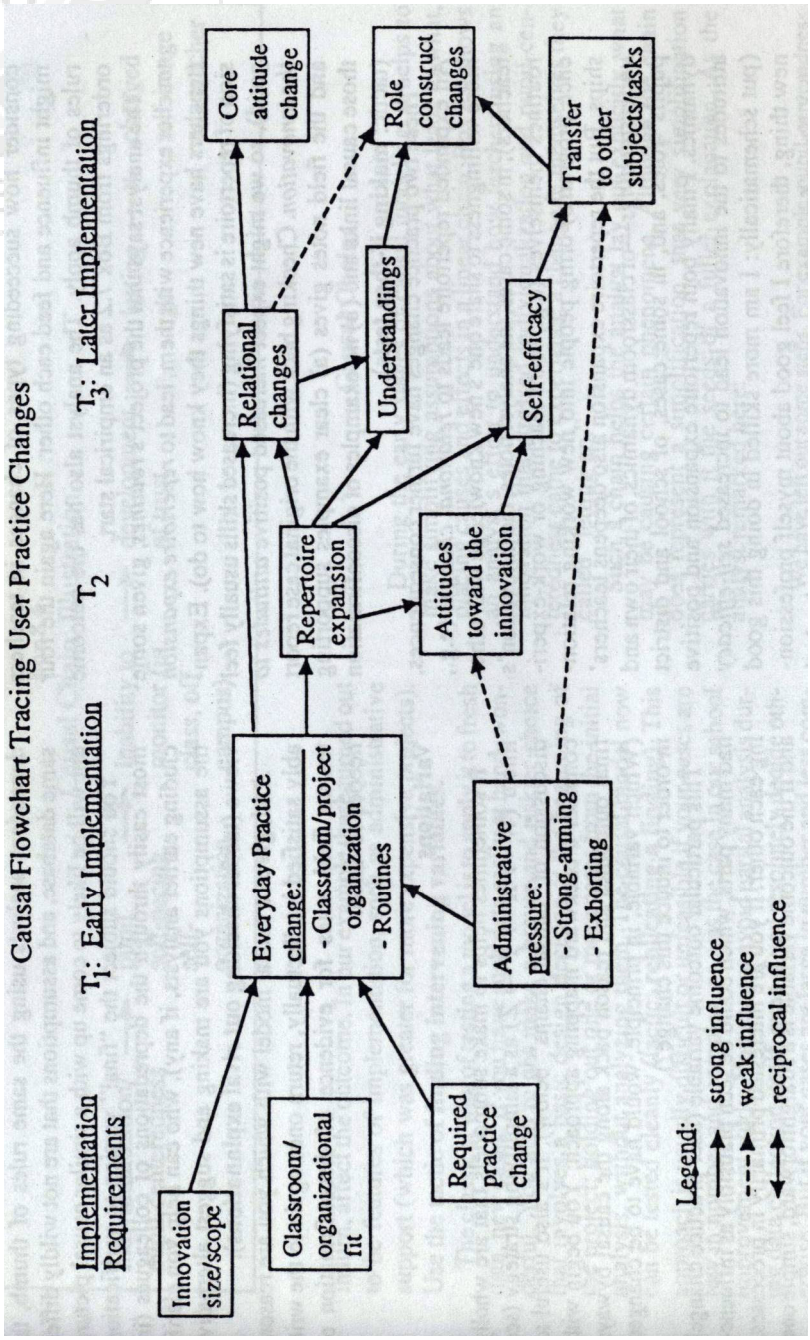
Example of variable-by-variable matrix display

Variable-by-Variable Matrix: Coping Strategies and Problems, by Case

STYLE	Coping Strategies	Program process	Program content	Target pop.	Skill lacks	Attitudes	Crises	Competing demands	Low control	Physical setting	Resources
-	Can't determine	B	A2						C1		
DO NOTHING	None	C2			C1	C2			C2		
TEMPORIZE	Delaying/avoiding		C1			C2					
DO IT THE USUAL WAY	Short-run coping	C1 C2	C1							C1	C1
	Using existing meetings/ roles	A2 B C1 C2	C2								C1 A2
	Action-taking	C1									
	People-shuffling		C1?			A1	C1 C2				C1
EASE OFF	Program modification		B	A1 B C1	B?	B		B			
DO IT HARDER	Symbolic support					A1 C1 C2		A1			
	Rewards/incentives					A1 A2 B C2					
	Negotiating										C2
	Pressuring/requiring					B C2					
BUILD PERSONAL CAPACITY	Person-changing	A2		A1 A2 B?	A1						
BUILD SYSTEM CAPACITY	New orchestration structure	A2 C1	C1		A2						A2 C1
	New interaction arenas			B							
	Vision-building/sharing		A1			A1 A2 B					
	Monitoring		C1								
	Rolling planning					A2					
	Ongoing assistance		A1								A1
ADD NEW PEOPLE	Re-staffing					A2 B					
REDESIGN THE SYSTEM	Increasing control							A1	B?		A1?
	Empowering	A1 A2 B?				A1 A2					
	Role redesign										A1
	Organization redesign										A1 A2

Legend: A1 Agassiz [more successful]
A2 Alameda
B Burroughs [moderately successful]
C1 Caruso [less successful]
C2 Chester
? Items with less researcher certainty

Example of causal flowchart display



Source: Miles MB and Huberman AM. Qualitative data analysis: An expanded sourcebook (2nd ed.). Thousand Oaks, California: Sage Publications, 1994.

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