ELSEVIER

Appetite 41 (2003) 239–244

Appetite

www.elsevier.com/locate/appet

Research Report
25th Anniversary Symposium of AGEV

Impact of nutrition behaviour research on nutrition programmes and nutrition policy

Ulrich Oltersdorf

Institute of Nutritional Economics and Sociology, Federal Research Centre for Nutrition, Haid-und-Neu-Str. 9, D-76131 Karlsruhe, Germany

Received 28 January 2003; revised 23 July 2003; accepted 16 August 2003

Abstract

Development of a society is interrelated with research. Innovation in food and nutritional sciences enable citizens to live in conditions of food security. Current dietary goals can be reached by understanding the biopsychosocial background of human nutrition behaviour. Examples of diffusion of such findings into practice are presented with emphasis on Germany and the activities of AGEV (the Working Association of Nutritional Behaviour), which was founded 25 years ago. Nutrition behaviour research should strengthen the focus on practical applications of its findings, since the prevalence of nutrition-related problems, like obesity in children and the estrangement on food and nutrition, is increasing.

Keywords: Diffusion of research; Practice from research; Biopsychosocial understanding

Introduction

The impact of nutrition behaviour research on nutrition programs and nutrition policy is part of social processes and interaction, which can only be understood with knowledge on the historical developments of human society.

Considered in general terms, there is without doubt an impact of research on society and vice versa. Society makes decisions which influence research, e.g. which resources are allocated to which topics in research and development. Practical applications of scientific results led to many 'industrial revolutions' and were 'motors of development.'

Human evolution is accompanied by inventions which were aiming to safeguard and to facilitate basic human needs. History of food and nutrition gives evidence for this, and it presents material to discuss the question 'What is science ?'. Curiosity and creativity are features of humans; sometimes progress is simply driven by fun, but sometimes of course also by intention and the pursuit of fulfilling needs, making live easier and more convenient. One can recognise in the pre-nutritional science era many inventions in the field of food and nutrition; e.g. controlled use of fire for food preparation; cultivation of soil with selected plants and observation of effects of daily meals on well-being and health. Empirical wisdom regarding food and nutrition was rather holistic. With inventions like the microscope, humans started to dissect biological material like foods into different parts, cells and particles, and even substances—marking the hour of birth of modern sciences. The tree of cognition is grown to a huge unmanageable plant, which is seen also in nutritional sciences (Bray, 1988).

The implementation of the results of scientific investigations in food and nutrition, leads to changes in the nutrition situation of individuals and societies. Such general interrelationships between 'nutrition and development' are scientifically approved; e.g. the head start model for individual and societal development (ACC/SCN, 2000).

If a society wants to change a situation, or in other words to reach certain goals, the support of applied research is needed in order to plan, to execute and to control 'evidenced based' programs. There are interrelationships of nutrition policymaking, nutrition research and nutrition monitoring (Briefel, 1996), which are used to structure this paper. In the following comments are given regarding nutrition policy and the setting of dietary goals; followed by information on

E-mail address: oltersdorf@bfe.uni-karlsruhe.de (U. Oltersdorf).

0195-6663/$ - see front matter © 2003 Elsevier Ltd. All rights reserved.
doi:10.1016/j.appet.2003.08.006

nutrition (behaviour) research and their dependence on nutrition monitoring. The examples given are biased to the situation in Germany, and are related to the history of the Working Association of Nutrition Behaviour (AGEV—*A*rbeits*g*emeinschaft *E*rnährungs*v*erhalten), which was founded in 1977.

History of nutrition policy

With changes in society, the dietary goals change, as do the related priorities for research into nutrition.

Recommendations for proper nutrition have a long tradition. Hippocrates (460–770 BCE) already recommended a balanced diet, sufficient physical activity and a moderate lifestyle in order to grow old in good health.

Food insecurity was common in history of mankind and there are timelines of famines for every country. Malthus (1766–1834) foresaw limits to feeding the growing population. Early nutrition policy was directed towards the goal of food security: to produce enough and safe food at reasonable prices, at least for basic foodstuffs. The practical application of former 'present' knowledge in agricultural, food and nutritional sciences is associated with the names of famous scientists such as Liebig (1803–1873), Voit (1831–1918) and Rubner (1854–1932). Their efforts together with other 'industrial revolutions' were successful. The success of agricultural and food research is remarkable. The food insecurity of former generations, originated by imbalances in food production and food needs related to time and region, seems to have disappeared.

All the chapters of this success story are related to substantial aspects of food and nutrition. An early era is related to energy and the main nutrients, as protein, carbohydrate and fat, the next one to micronutrients, especially vitamins, which were detected in the first half of the 20th century. A view on the history of food policy indicates the belief in and the apparent success of technical solutions for problems of the society. The dietary goals were described in recommendation for nutrient allowances.

In retrospect, it can be observed that nutrition policy had high priority in times of crisis; like those of the wars in Europe (1870/71; World War I and II). In wartime conditions, the governments were fostering relevant research in food and nutrition.

For a few decades now, there has been a surplus on save and cheap food. Almost every time and everywhere we can simply say that food is 'within arm's length'. Currently in Germany there are 230,000 different processed food items listed with barcodes, and in addition many types of fresh food are sold in different food outlets. Modern food production is under professional control—well regulated by food policy and food laws. The old dream of Cockaigne ('The Story of Schlaraffenland') is almost fulfilled.

Yet within many societies the democracy of surplus of goods including foods has created a new epidemic, that of maladaptation of human behaviours to surplus and inactivity ('Schlaraffenland Syndrome'). First time in the world there are as many overfed people (one billion) as hungry ones (Gardener & Halweil, 2000). Current nutrition research reveals that the biological set-up of humans is not adapted to the modern surplus situation. We have biologically implemented rules for saving energy making us eat when there is food and only move when it is necessary (Daniel, 2000, 2003).

Besides of food hygiene risks the main nutritional problems of industrialised countries are related to human behaviour. Poor food quality and food contamination with toxic substances are of minor relevance; the main health problems are currently related to modern life style, and these cannot be neglected. Since they can be prevented, it is an ethical obligation for a society to be concerned about it, and there are also economical reasons to do so. The preventable health disorders are associated with high costs. The society should aim at nutrition security; the nutrition policy has to define appropriate dietary goals and implement nutrition programs to support changes in human behaviour towards a lifestyle which is more healthy. A good example is the ABC of the Healthy People 2010 program of the US government (USDA, 2003).

In addition ecological problems are recognised. Thirty years ago, a report of the Club of Rome launched the discussion of new limits of growth ('neo-malthusianism') and the consideration of sustainability as a development goal. These are now also regarded in new dietary goals, e.g. First Action Plan for Food and Nutrition Policy of the WHO European Region (WHO-Europe, 2000).

Traditional wisdom tells us that it is not enough to know the right things in order to behave in the right way. Modern behaviour research approved that pure appeals to individuals calling for a change of behaviour and lifestyle are generally unsuccessful. Individuals should not be blamed for having a wrong lifestyle and being unsuccessful in adopting better ones, since human behaviour is not independent from socio-cultural conditions. Nutritional problems are indicators of problems of a society; eating disorders cannot be understood without knowing socio-psychological relationships. Surplus conditions and convenience offers are backgrounds for the observed increase in obesity (Willett, 1998). There is a need for adoptions of the conditions of the society in order to enable people to reach dietary goals. If there are no roads to health, nobody can reach it, and there will be no nutrition security. We have to know more about human behaviour in order to promote health life styles.

History of nutrition behaviour research

As already mentioned, in food and nutritional sciences the main emphasis was put on the substances (nutrients and non-nutrients) of food, and the socio-cultural dimensions

were almost completely neglected. But like a language, food behaviour is not natural and inherent, but socio-cultural grown and structured. It is the result of a socio-cultural process. Food and nutrition is a 'total social fact' (Mauss, 1968). Every coherent social group has an own cultural system; and food is a part of it and connected to all its other parts. The society establishes rules and norms on how to deal with food. Foods are used as presents, but also as punishment. Food is a tool of power. Foods have meanings, images, and symbols. Learning to eat in the period of childhood, is part of the processes of socialisation and forms the personality. Foodways indicate relationships in families and other social groups.

In the historical view there are some indications of the impact of nutrition behaviour research on nutrition policy. An important first step to integrate interdisciplinary studies of food behaviour into nutrition research was taken during World War II (Wilson, 2002). There was the US Committee on Food Habits with the well-reputed anthropologist Margret Mead (Mead, 1943) as one of its member and the Interdepartmental Committee on Nutrition and National Defence issued a manual for food and nutrition surveys.

But after this first stimulation of nutrition behaviour research, there was no continuity. Nutrition behaviour research was always at the edge of mainstream nutrition research.

Other steps to promote nutrition behaviour research are related to the AGEV history. In 1977, Hans Jürgen Teuteberg, a historian of the University of Münster, initiated and organised a first interdisciplinary meeting of a group of scientists of various disciplines, with the common interest in food behaviour research. In the German Nutrition Report of 1976, Teuteberg (1976) described the situation and the need to foster this type of research, in order to reach dietary goals, in the following terms.

> Theory and concept: Eating and drinking is more than satisfying basic needs, hunger and thirst. Food habits are embedded in value systems of the individual and the society…food and health are more than body function and physiology…Food behaviour is determined by individual psychological factors and socio-cultural ones. Food behaviour is the result of a socio-cultural process (socialisation). The central construct of food behaviour research is the Meal. The theoretical model adopts the basic models of Talcott Parsons (structural, functional systems) and uses the following important explanatory variables: time, situation, psychosocial values (preferences, avoidance); social communication,…Prevention has to recognise the socio-cultural determinants of food behaviour.

Since the German ministries of agriculture and health were responsible for this report as for all the other German Nutrition Reports, one might assume that politicians would know the importance of psychological and socio-cultural aspects of nutrition behaviour.

In Germany, nutrition behaviour research was and still is scattered. Stimulation often came from international co-operation, e.g. nutrition psychology in the US; important were also the activities related to the food choice conferences and their sustaining associations.

The current understanding of nutrition behaviour can be summarised in biopsychosocial models. Activities of AGEV are involved in the development of these models (Bodenstedt, Oltersdorf, Hendrichs, & Boeing, 1985). The models integrate physiological processes and signals, which are learned by the individual (psychology) and formed by the society. To be successful, nutrition programs have to incorporate these models considering individuals in micro-structures (i.e. families, households) and macrostructures (i.e. community, society). The practical use of nutrition behaviour models for nutrition programs requires data, that means dietary surveys and nutrition monitoring are necessary.

History of nutrition behaviour monitoring

Most of the techniques currently used in dietary surveys were developed during the 4th and 5th decade of the 20th century; these are retrospective interviews like 24 h-recall and the dietary history and prospective protocol methods. Today, these methods are used in the many nation-wide surveys; as it is recently summarised by the EFCOSUM-Group (European Food Consumption Survey Methods) (Löwik & Brussard, 2002).

For this central part of nutrition policy the input of knowledge of food behaviour research is insufficient and marginal. Mostly, the gathered information is condensed solely to foods and nutrients presented in average amounts. Food behaviour relevant information on the eating situation, such as eaten at which meal, with whom, with what ambience, in which portion, combination and arrangement and so on, are mostly missing in the questionnaire; and if included, they are rarely selected for data analysis and reports. At an AGEV workshop (Oltersdorf, 1996) the situation was summarised as follows:

> Since food habits are under-investigated even in Europe, a great deal of research is needed. The following topics were identified. Eating patterns (spatio-temporal structure of food and drink intake; meals, snacks, drinks): basic research is needed to provide better methods of identifying patterns. Relationships between eating patterns and nutritional status and health. The context of eating: the family, gender, paid work, culture; social roles of food and of health. Roles of food in everyday life, e.g. the time budgets of different consumers; interactions of eating with other activities. Beliefs and emotions related to eating practices, food materials, food technology and

food-related safety and health. Role of international culture in food habits and their changes. Influences on eating habits by public authorities and by media.

Minorities and underprivileged groups, older people in various life situations and single-person households were identified as research target groups.

Other research needs were related to methodology. Interdisciplinary work between natural and social scientists must be enhanced, including collaboration in developing methods (e.g. surveys) and cross-cultural comparisons. Truly longitudinal studies are needed, as well culturally and personally sensitive research methods. Educational, media and other interventions must be evaluated in their processes and outcomes; and finally there is a need for increased standardisation of methods.

Very often neglected is the second part of the nutritional balance. The intake of food and nutrients has to be compared with the corresponding requirements, and these depend on physical activity, time use patterns and general life style.

The information collected by the monitoring processes has to be evaluated and compared with the dietary and life style related goals. As already mentioned above, the main targets are nutrient based, but from the point of view of nutrition behaviour research one can observe a certain shift towards the right direction: goals become food-group based (e.g. food pyramids) and more holistic dietary evaluations are applied (e.g. healthy eating indices). Even ideal cuisines are generally recommended, like the mediterranean diet. Apparently we are coming back to the roots of former time's wisdom, the lifestyle recommendation of Hippocrates, an ancient mediterranean.

History of nutrition education and nutrition programmes

The right of food, to divide and share food, is ancient; roots of early nutrition programs are the food aids for the poor; and the advise and introduction of eating rules and manners. From the point of view of the target groups, the development of nutritional sciences caused that the contents of nutrition programs became more scientific rational, and less practical.

Policy makers too often consider eating and handling food primarily as matter of the individual's choice, neglecting the cultural and social influences. Most of the nutrition programs of the last century were based on such a comprehension, and proved to be unsuccessful. Results of international research on nutrition behaviour provided biopsychosociocultural theories and social-marketing approaches as a basis of modern public health nutrition programs. The society has an important part in nutrition programs; it has to build the structures that enable individuals to behave in the proper way (e.g. Ottawa Charta; WHO, 1986).

Several AGEV activities promoted public health nutrition in Germany, of course with the help of the international scientific community. But still public health nutrition is not yet established in Germany.

The historical view gives a inhomogeneous picture on the impact of nutrition behaviour research on nutrition programs and nutrition policy. Looking into the future there are improvements possible.

Challenges for nutrition behaviour research at present and in the near future

The results of nutrition behaviour research still did not convince the majority in the society, especially not the politicians, that a better understanding of human behaviour is needed for future development of the individuals and the society. For scientists working in this field it is evident that the application and implementation of knowledge provided by behaviour research is necessary for a society to reach their goals, to relief many nutritional and health problems, and even ecological ones. We have to consider in which way, perhaps with which research can we communicate the message: 'Behaviour research pays'.

The trend in the nutrition situation indicates that the behaviour relevant problems are increasing in future. In industrialised societies the importance of the last link of the food chain is ignored, the consumers' competence in food handling and eating. Whereas the global scientific knowledge on food and nutrition is increasing continuously, a reverse trend regarding consumers' competences can be observed. Despite the scantiness of corresponding empirical data, it is obvious that the knowledge and experiences of consumers regarding food handling is decreasing in an accelerating way.

The background of this situation is part of the phenomenon that the knowledge of mankind is increasing exponentially, but the capacity of knowledge of an individual remains almost constant, despite of all psychological and pedagogic efforts for information management (Nowotny, 1997; UNESCO, 2003). Due to the developments in information technology, in principle all information is available always and to everybody (e.g. 24/7—the world wide webs are active 24 h a day and 7 days per week). Facing the ocean of the world wide information on all aspects, a trend is observable that the ranking of the importance of the everyday, the normal information is continuingly decreasing. This is also true within the scientific community: the everyday behaviour research has quite a low prestige, still with a negative tendency. In Germany, for instance, multi- or interdisciplinary nutrition research activities are diminishing instead of growing.

The belief in mechanistic models—the hope of finding the 'trivial' machine (Foerster, 2001) that solves all problems—has had a renaissance because of advances in molecular biology. The optimistic idea is that, if we knew all about

the molecular structures of our foods, and all about the molecular structures in humans, then we could design proper functional foods and engineer and select human beings who are fit for life (Desiere, German, Watzke, Pfeifer, & Saguy, 2002). It will be difficult to compete with this faith in technical solutions to our problems. Changing habits, however, is not an easy task, especially when seemingly easy solutions are offered. The 'om'-area (genomics, proteonomics, metabolomics) of genetic engineering offers 'promising pills' as indulgence for the everyday sins.

For activities to reach dietary goals it is obligatory to understand consumer behaviour and to know models and frames for it. Basic capabilities to manage one's life are trained in long lasting processes from infancy to adulthood—that is, the ability to communicate (speaking, walking, mobility) and to eat. Eating is an everyday activity of everybody; it is common to have 3 or 4 meals a day, and so about 1000 a year. Though such everyday activities appear to be simple, they are in fact very complex processes. Everyday activities need to be organised and managed; the corresponding institution is a household. The prerequisites for eating are proper equipment, like store, stove, table and dishes. The time for eating has to match one's own and possibly other household members' further activities. The necessary resources have to be considered; that are the economic and material bases, and also the human capital, that is the competence to manage the household system.

Traditional learning processes are weakened; this relates to the informal way that knowledge and experiences are transferred from the older to the younger generation, when both are living and working together in same household. Today, many young parents have low competence and interest in preparing food; many people live alone. The obligation of the society is to educate the population; bearing self-responsible citizens, who can well manage their own lives and support the development of the society. This part of education includes competences for everyday activities. But it can be recognised that food and nutrition competences are diminishing elements of the education in kindergartens and elementary schools (Heseker, Schneider, & Beer, 2001).

This illustrates the reciprocal trends that science produces more knowledge on food and nutrition; but there is less application and competence among the consumers and in the society. It is not only a cultural loss when we loose gastronomy and have 'food illiterates' in the society. Living in 'gastro-anomia' (Fischler, 1979) with low competence and lack of trust in the own behaviour makes susceptible to disorientation and misguidance.

What are the consequences? Considering human beings strictly physiologically we might be on a good way. It could lead to a development where our food and nutrient intakes are technologically controlled. The physiological status of our organism is monitored by bio-sensors and computerised expert systems. Such 'pro-sumer'-systems determine an individual consumer's needs and lead him or her to consume individually designed functional foods. In addition, further parts of our life can be optimised and designed by science and technology, e.g. the organisation of trade (distribution design) and communication (information design). The whole household can be e-managed. Nevertheless, there will be one problem: humans have to accept and to get used to these high-tech innovations. The 'soft' sciences have to care for usability and practicability.

There are different options for the development of the society, however, besides living as externally programmed by expert systems. We have to observe the processes in our society. The everyday situations of consumers have to be studied more intensively; indicators are needed for follow-up the developments towards dietary goals. Investigations on nutrition behaviour should emphasise on:

- longitudinal perspectives; that is to consider the time dimension in changes of behaviour related to social and cultural changes;
- housekeeping activities, like time management and food competences;
- food and nutrition competences of professionals in nutrition programmes;
- effects of information and communication for changes in nutrition behaviour.

The society needs us to provide information about that and there is an obligation for us to do. It is a human right having access to appropriate information, services and good nutrition (Brom, 2000; FAO, 2003).

Acknowledgements

This paper is based on a contribution to the Symposium on 'Sensible policies for nutrition and life-style intervention' held at the 10th Food Choice Conference, Wageningen, on 2 July, 2002, to celebrate the 25th anniversary of AGEV (Arbeitsgemeinschaft Ernährungsverhalten), the Association for Research in Nutritional Behaviour.

References

ACC/SCN (Acting Coordination Committee/Subcommittee on Nutrition) (2000). *Fourth report on the world nutrition situation*, Geneva: ACC/SCN. See also: http://www.unsystem.org/scn/Publications/rwns/worldnutritionsituation.htm.

Bodenstedt, A., Oltersdorf, U., Hendrichs, A., & Boeing, H. (1985). M.A.R.S.—multiple automatic regulatory system. A comprehensive theoretical approach to emipirical studies of nutrition behaviour. In J. M. Diehl, & C. Leitzmann (Eds.), *Measurements and determinants of food habits and food preferences: Report of an EC workshop, 1.-4.5.1985, Gießen* (pp. 294–300). Wageningen: EURO-NUT Report No. 7.

Bray, G. A. (1988). On the shoulder of giants. *American Journal of clinical Nutrition*, *48*, 929–935.

Briefel, R. R. (1996). Nutrition monitoring in the United States. In E. E. Ziegler, & L. J. Filer, Jr. (Eds.), *Present knowledge in nutrition* (pp. 517–529). Washington, DC: ILSI Press.

Brom, F. W. A. (2000). Agricultural and food ethics from consumers concerns to professional ethics. *Italian Journal of Food Sciences*, *12*(4), 395–401.

Daniel, H. (2000). Ernährungswissenschaft in Lehre und Forschung: Standortbestimmung und Entwicklungsperspektiven. *Ernährung-sumschau*, *47*(7), 256–260.

Daniel, H. (2003). *Ernährungsprobleme zwischen Genomfalle und Genchips*, Internet-URL: http://www.nutrition.tum.de/insci/phys/ppt/dge.ppt and http://www.nutrition.tum.de/insci/phys/millennium/sld010.htm (assessed 2003-01-28).

Desiere, F., German, B., Watzke, H., Pfeifer, A., & Saguy, S. (2002). Bioinformatics and data knowledge: the new frontiers for nutrition and foods. *Trends in Food Science and Technology*, *12*, 215–228.

FAO (2003). *Ethics in food and agriculture—Food as a human right*, Internet-URL: http://www.fao.org/Ethics/index_en.htm.

Fischler, C. (1979). Gastro-nomie et gastro-anomie: sagesse du corps et crise bioculturelle de l'alimentation moderne. *Communications*, *31*, 189–210.

Foerster, H. (2001). *Short cuts*. Frankfurt/M: Zweitausendeins.

Gardner, G., & Halweil, B (2000). Escaping hunger, escaping excess. *World watch magazine* (July/August). Internet-URL: http://www.worldwatch.org/bookstore/merchant.mvc?Screen = PROD&Store_Code = WIB&Product_Code = EP134B

Heseker, H., Schneider, L., & Beer, S. (2001). *Ernährung in der Schule. Forschungsbericht für das Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft (BMVEL)*, Bonn: BMVEL.

Löwik, M. R. H., & Brussaard, J. H. (2002). EFCOSUM: European food consumption survey method. *European Journal of Clinical Nutrition*, *56*(Suppl. 2), S1–S96.

Mauss, M. (1968). *Die Gabe: Form und Funktion des Austausches in archaischen Gesellschaften*. Frankfurt/M: Suhrkamp.

Mead, M. (1943). Dietary patterns and food habits. *Journal of the American Dietetic Association*, *19*, 1–5.

Nowotny, H. (1997). Transdisziplinäre Wissensproduktion—Eine Antwort auf die Wissensexplosion? In F. Stadler (Ed.), *Wissenschaft als Kultur. Oesterreichs Beitrag zur Moderne* (pp. 177–195). New York: Springer.

Oltersdorf, U. (1996). Impact of changing food choices and eating habits on nutritional status in European countries. Workshop, Freising–Munich, 21–22 October 1995, under the auspices of IUNS, AGEV and BFE. *Appetite*, *27*, 91–94.

Teuteberg, H. J. (1976). Psychosoziale Ursachen des Fehlverhaltens in der Ernährung. In Deutsche Gesellschaft für Ernährung (DGE) (Ed.), *Ernährungsbericht 1976* (pp. 395–445). Frankfurt/M: DGE.

UNESCO (2003). *Communication and information in the knowledge society*, Internet-URL: http://www.unesco.org/webworld/index.shtml.

USDA (US Department of Agriculture) (2003). *Nutrition and your health: dietary guidelines for Americans*, Internet-URL: http://www.health.gov/dietaryguidelines/ and http://www.healthypeople.gov/document/.

WHO (World Health Organisation) (1986). *Ottawa charter for health promotion. First international conference on health promotion, Ottawa, 21 November 1986*, Genf: WHO/HPR/HEP/95.1 Internet-URL: http://www.who.int/hpr/archive/docs/ottawa.html.

WHO-Europe (2002). *First food and nutrition action plan for Europe 2000–2005*. Copenhagen: WHO, Internet-URL: http://www.who.dk/nutrition/ActionPlan/20020729_1.

Willett, W. (1998). Is dietary fat a major determinant of body fat? *American Journal of clinical Nutrition*, *67*(Suppl.), 556S–562S.

Wilson, C. S. (2002). Reasons for eating: personal experiences in nutrition and anthropology. *Appetite*, *38*, 63–67.