

**Nutrition communication in Dutch general practice:
Integration of the patients' perspective and the family doctors' perspective**

Sonja van Dillen

Promotoren: Prof. dr. ir. G.J. Hiddink
Hoogleraar Voedingsvoorlichting via Intermediairen
Wageningen Universiteit

Prof. dr. C.M.J. van Woerkum
Hoogleraar Communicatiemanagement
Wageningen Universiteit

Co-promotor: Dr. M.A. Koelen
Universitair Hoofddocent Communicatie- en Innovatiestudies
Wageningen Universiteit

Promotiecommissie: Prof. dr. L.W. Green, University of California, Berkeley, U.S.A.
Prof. dr. J.J. van Binsbergen, UMC St. Radboud, Nijmegen, Nederland
Prof. dr. W.A. van Staveren, Wageningen Universiteit, Nederland
Dr. H.W. Vaandrager, Wageningen Universiteit, Nederland

Dit onderzoek is uitgevoerd binnen de onderzoekschool Mansholt Graduate School of Social Sciences.

**Nutrition communication in Dutch general practice:
Integration of the patients' perspective and the family doctors' perspective**

Sonja M.E. van Dillen

Proefschrift

ter verkrijging van de graad van doctor
op gezag van de rector magnificus
van Wageningen Universiteit,
prof. dr. ir. M. J. Kropff,
in het openbaar te verdedigen
op woensdag 5 oktober 2005
des namiddags te vier uur in de Aula

Van Dillen, Sonja Maria Elisabeth

Nutrition communication in Dutch general practice: Integration of the patients' perspective and the family doctors' perspective

Thesis Wageningen University – with references – with summary in Dutch

ISBN 90-8504-248-8

ABSTRACT

A sound nutrition advice is important for patients with coronary heart disease, diabetes and obesity. The family doctor has high potential to promote nutrition to their patients through its broad reach, including the hard-to-reach low socio-economic class. Unfortunately, in daily practice of most family doctors, this nutrition communication is not optimal. Therefore, a combination of qualitative and quantitative studies among patients and family doctors was performed in order to explore and assess their communicative characteristics regarding nutrition communication.

In our literature review, we searched for studies about the occurrence, the patients' perspective and the family doctors' perspective regarding nutrition communication in general practice. It can be concluded that results about the occurrence of nutrition communication in general practice differed widely. Moreover, patients' perceptions regarding nutrition communication through family doctors appeared to be positive. Family doctors' perceptions were positive too, but they also experienced several barriers, such as lack of time and patient non-compliance.

To explore and assess the patients' perspective, we used focus groups, in-depth interviews and face-to-face interview-assisted questionnaires. A discrepancy between perceived relevance and information needs regarding food topics was discovered. Patients' perceptions regarding nutrition communication through family doctors were positive. Whereas patients had difficulties with estimating their nutrition behaviour, nutrition awareness is important as a first step in behavioural change. With our hypothetical model, we were able to unravel the concept of nutrition awareness. Individual variables were more prominent than environmental variables. In addition, gender and age added to our model. Total explained variance appeared to be 54%.

In order to explore and assess the family doctors' perspective, we used focus groups and questionnaires. These studies showed that family doctors' were positive about nutrition communication towards their patients. However, they did not always feel capable to communicate about overweight. Moreover, family doctors used a combination of nutrition communication styles, namely informational, reference, motivational, confrontational and holistic nutrition communication styles. Our hypothetical model was tested for each nutrition communication style and showed explained variances up to 57%. Individual variables were the best predictors and socio-demographic variables did not add to the models. It is recommended that family doctors become convinced that patients prefer them for nutrition communication. Raising nutrition awareness among patients is necessary. Finally, we advise that family doctors realise that they can apply different nutrition communication styles.

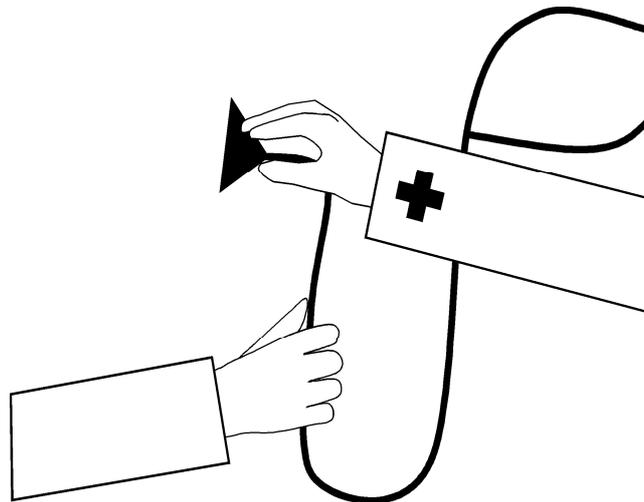
CONTENTS

Chapter 1	Introduction	9
Chapter 2	An overview of nutrition communication in general practice.	25
Chapter 3	Understanding nutrition communication between health professionals and consumers: development of a model for nutrition awareness based on qualitative consumer research. <i>Am J Clin Nutr 2003; 77: 1065S-1072S.</i>	45
Chapter 4	Perceived relevance and information needs regarding food topics and preferred information sources among Dutch adults: results of a quantitative consumer study. <i>Eur J Clin Nutr 2004; 58: 1306-1313.</i>	61
Chapter 5	Exploration of possible correlates of nutrition awareness and the relationship with nutrition-related behaviours: results of a quantitative consumer study. <i>Submitted for publication.</i>	77
Chapter 6	Identification of nutrition communication styles and strategies: a qualitative study among Dutch GPs. <i>Submitted for publication.</i>	91
Chapter 7	Nutrition communication styles of family doctors: results of quantitative research. <i>Eur J Clin Nutr 2005; 59: S47-S56.</i>	111
Chapter 8	Conclusions and discussion	129
References		151
Summary		165

Samenvatting	169
Dankwoord	173
List of publications	175
Curriculum vitae	179

CHAPTER 1

INTRODUCTION



Based on:

Van Dillen S, Hiddink GJ, Koelen M, De Graaf C, Van Woerkum C. Towards a more effective nutrition communication between health professional and consumer: The consumer perspective. *Amsterdam School for Cultural Analysis (ASCA) and Mansholt Conference 'Eat and Drink and Be Merry? Cultural Meaning of Food in the 21st Century'*, Workshop Health, Healing and Well-being, Amsterdam, June 3-5, 2002, 24-31.

Van Dillen SME, Szwajcer EM, Van Binsbergen JJ, Hiddink GJ, Van Woerkum CMJ. Experts and non-experts in health care settings: an area of tension? *Submitted for publication.*

Family doctors are being more and more confronted with patients who suffer from nutrition-related diseases, such as coronary heart disease, type 2 diabetes and obesity. Family doctors have to inform these patients in the process of decision making about their treatment. In addition, health promotion (including nutrition) is an important task in the daily practice of family doctors. Communication can be seen as one of the main ingredients in medical care. However, there is room for improvement where the topic nutrition is concerned. Research has shown that patients' expectations regarding nutrition communication clash with family doctors' expectations regarding nutrition communication. On the one hand, patients expect nutrition communication from their family doctor. On the other hand, family doctors perceive serious barriers to providing nutrition information in their practice. As a result, nutrition communication between family doctors and patients sometimes goes wrong and becomes an area of tension.

In order to provide recommendations for more effective nutrition communication between family doctors and patients, further research is required to explore and assess both patients' and family doctors' perspectives on nutrition communication. Therefore, this thesis discusses nutrition communication between family doctors and patients in-depth. In the introduction, the state of the art regarding the nutrition behaviour of Dutch consumers will be presented. Next, doctor-patient interaction will be discussed, taking into account recent developments between doctors and patients, and theories and models for doctor-patient communication. The focus shifts then to nutrition communication, including patients' and family doctors' perspectives on nutrition communication, nutrition interaction between family doctors and patients, and conditions for effective nutrition communication. As a result, the main objective and research questions will be stated. Finally, an outline of the thesis will be provided.

STATE OF THE ART: NUTRITION BEHAVIOUR OF DUTCH CONSUMERS

In the Netherlands, several reports stressing the importance of nutrition behaviour have been published recently by the National Institute for Public Health and Environment.

The report of Jansen et al. (2002) was based on several background studies. The authors focused on unhealthy behaviour in specific target groups. In their view, nutrition behaviour can be seen as part of general (un)healthy behaviour. In this report, current nutrition behaviour was described for four specific target groups, namely, people with low socio-economic status, youngsters, the elderly and migrants.

Introduction

People with low socio-economic status had the most unfavourable profile compared to youngsters, the elderly and migrants. People with low socio-economic status consumed too much fat, too little fruit and too few vegetables.

Youngsters displayed a fat intake comparable to the total population. However, they had a considerably low fruit and vegetable consumption. Youngsters' fruit and vegetable consumption showed a strong, unfavourable trend, especially for girls. There appeared to be a favourable trend with respect to youngsters' total fat consumption.

For the elderly, fat consumption was comparable to the total population. The fruit and vegetable consumption of the elderly was considerably higher than the rest of the population. Moreover, favourable trends with respect to fat consumption and vegetable consumption were observed among the elderly. However, the fruit consumption of the elderly had strongly decreased during the past ten years.

Migrants displayed lower fat consumption than the total population. Furthermore, they showed higher fruit and vegetable consumption than the total population.

The third Dutch Public Health Status and Forecasts report of Van Oers (2002) focused on public health, health care and prevention in the Netherlands, based on several overview studies. A considerable amount of annual mortality is linked to behaviour and to nutrition in particular. Those factors are too much saturated fat (5%), too little fruit and too few vegetables (5%), high blood pressure (6%) and severe overweight (6%).

Van Kreijl and Knaap (2004) provided an overview of food consumption in the Netherlands and its consequences for public health. They concluded that the life expectancy of Dutch people has shortened by an average of two life years, due to eating too much, and eating a less balanced diet. People ate too little fish, too little fruit, too few vegetables and too much saturated fat. Van Kreijl and Knaap also looked at the consequences for public health of unfavourable food consumption, food infections and overweight. We will report their conclusions shortly.

Unfavourable food composition leads to 40,000 new cases of diabetes, coronary heart disease and cancer altogether per year in the Netherlands. Unfavourable food composition also leads to 13,000 deaths per year in the Netherlands.

Food infections lead to between 20 and 200 deaths per year. Yearly, there are between 300,000 and 700,000 cases of gastro-enteritis that can be attributed to food infections, and 32,000 cases of food allergies. Van Kreijl and Knaap conclude that health loss through unhealthy food is between 40 and 100 times greater than health loss through unsafe food.

Overweight also leads to 40,000 new cases of diabetes, coronary heart disease and cancer altogether per year. Furthermore, overweight leads to 7,000 deaths per year. Since overweight is strongly related to nutrition behaviour, we shall elaborate on this topic. Overweight often occurs in men, the elderly, people with a low education level, people who have given up smoking and women after pregnancy. Serious overweight is appearing more often and at a younger age (Van Oers, 2002). In 2004, the Dutch Minister of Health, Welfare and Sports stated that Dutch people do not live healthily enough. Overweight was one of the three themes chosen as spearheads for prevention policy, the other two being smoking and diabetes (VWS, 2004). Nowadays overweight (Body Mass Index (BMI) \geq 25.0) occurs in 40% of Dutch adults, of whom 10% can be classified as obese (BMI \geq 30.0) (Visscher et al., 2002). Since 2000, obesity has been considered as a disease by the World Health Organisation (WHO, 2000). The Health Council of the Netherlands estimates that between 15 and 20% of Dutch adults will become obese, if the current trend continues (Health Council of the Netherlands, 2003).

It can be concluded that much can be improved in the current nutrition behaviour of Dutch consumers. Obesity, in particular, has become one of the most important, but also most difficult, public health problems. Family doctors can play a major role in strengthening the motivation and capabilities of their patients to change nutrition behaviour. They reach nearly all segments of the population, including the hard-to-reach low socio-economic groups.

DOCTOR-PATIENT INTERACTION

First, recent developments in doctor-patient interaction will be described. Furthermore, theories and models for doctor-patient communication will be clarified.

Recent developments in doctor-patient interaction

In the past few decades, the relationship between doctors and patients has changed significantly. Historically, the relationship between the doctor and the patient has been viewed as a hierarchical relation. Doctors have medical expertise, so they are considered to be experts, while patients are considered to be laymen. However, the clear distinction between expert and layman has become blurred. Nowadays, doctors are confronted with well-informed and critical patients. Patients are likely to become more medically and nutritionally literate. Moreover, health professional expertise is no longer automatically appreciated and accepted as a form of superior knowledge. Patients have expertise in relation to their own body and lifestyle. As a result, there is a shift in the doctor-patient

Introduction

relationship, which now focuses on sharing resources and negotiating treatments (Kourhis-Blazos et al., 2001). It is becoming a more equal relationship.

In 2001 the chief medical officer for England introduced the term 'expert patient'. Expert patients are people who have the confidence, skills and information to play a central role in the management of life with diseases (Department of Health, 2001). This might be seen as empowerment: a subjective feeling of greater control over one's own life experienced by an individual following active membership in groups or organisations (Koelen & Van den Ban, 2004). Doctors are increasingly encouraged to involve patients in treatment decisions, recognising patients as experts with a unique knowledge of their own health and their preferences for treatments, health states and outcomes (Say & Thompson, 2003). Doctors must make it clear that they want patients to become expert patients (Lorig, 2002). Patients do have the possibilities to develop their own expertise. Medical knowledge is widely available, including for patients to prepare themselves before consulting the doctor. Patients can collect (often contradictory or incomplete) health information from a wide variety of sources, such as their social network and the media, including the Internet (De Almeida et al., 1997). Use of the Internet for health information continues to grow rapidly and may have an impact on the doctor-patient relationship. However, many doctors are suspicious: they are of the opinion that there is a risk that expert patients may demand particular treatments that are unproved, unsuitable or expensive. So the term 'involved' is less prone to provoke hostility than 'expert patients', because involvement clearly requires at least two parties (Shaw & Baker, 2004).

The Internet, however, may improve patients' ability to interact efficiently and productively with doctors. In some cases, it may make them better able to care for themselves (Baker et al., 2003). The Internet should by no means replace a face-to-face consultation with a doctor, but information acquired from it may prompt the patient to ask more questions, and also ask the right questions (Kourhis-Blazos et al., 2001). Results from a Dutch study showed that 15% of doctors are daily confronted with one or more patients who want to discuss health information from the Internet with them (RVZ, 2002). The study of Malone et al. (2004) showed that patients more often confronted family doctors with health information from the Internet than other health professionals. Health professionals in primary care, who are 'generalists', may feel vulnerable when confronted with patients who have 'specialist information' from the Internet. Doctors have stereotypical views of Internet users and fear for their own professional status in relation to the Internet-informed patient. As a result, doctors should consider alternative strategies in coping with Internet-informed patients (Van Woerkum, 2003).

All in all, in contemporary information society the roles of family doctors and patients have changed. Family doctors are no longer the sole experts. Patients do have access to expert information. Family doctors need to deal with the changing relationship between family doctors and patients in their daily practice, and even with Internet-informed patients. Possibly, family doctors may adapt their communication style depending on the patient sitting in front of them.

Theories and models for doctor-patient communication

Where doctor-patient communication is concerned, several variables can be identified. Ong et al. (1995) presented a theoretical framework for doctor-patient communication, relating background, process and outcome variables. Background variables, which seem to play a role in doctor-patient communication, are culture, opinions of the doctor-patient relationship, types of patients and doctors, and disease characteristics. Process variables occur within the medical encounter and include types of communicative behaviours, such as task-focused versus affective behaviour. Outcome variables, such as satisfaction, compliance, recall and understanding of information, and health status, are used to assess the effectiveness of doctor-patient communication.

With respect to doctor-patient communication, several arrangements have been developed, among other things, communicative behaviours, communication styles in general and communicative models.

In medical communication, communicative behaviours can be divided into task-focused behaviour on the one hand and affective behaviour on the other. Task-focused behaviour is instrumental of nature, and is defined as technically based skills in problem solving, which compose the base of expertness for which the doctor is consulted. Affective behaviour is defined as behaviour that is designed to establish and maintain a positive relationship between the doctor and his patient (Ong et al., 1995). Recent research among Dutch family doctors (Van den Brink-Muinen et al., 2004), however, demonstrates that, although family doctors provide more information and involve patients in the decision-making process (that is, task-focused behaviour), less socio-emotional behaviour (that is, affective behaviour) is shown. One possible explanation is the focus on evidence-based and protocol-based health care. As a consequence, communication with family doctors is particularly characterised by task-focused communication. This constitutes a risk for the quality of the communication between family doctors and patients. Both task-focused and affective communication are essential to meet the needs of the patients in order to be patient oriented.

Another arrangement of doctor-patient communication is based on communication styles. According to Street (2002), one's communication style serves as a pragmatic function in that it

Introduction

represents a set of responses that are readily available and appropriate for communicating across various situations. Roter et al. (1997) revealed five distinct communication styles, namely, narrowly biomedical (i.e. giving biomedical information), expanded biomedical (i.e. asking questions), biopsychosocial (i.e. biomedical and psychosocial exchange), psychosocial (i.e. psychosocial and social exchange) and consumerist (i.e. answering questions).

Furthermore, the above-mentioned recent developments in doctor-patient communication are also recognisable in different communicative models (Van Woerkum, 1999; Koelen & Van den Ban, 2004). In this arrangement, three communicative models of interpersonal communication between family doctors and patients can be distinguished. In the prescription model (or medical model), the family doctor provides information and patients are expected to process this and act accordingly. The second model is the persuasion model: the family doctor provides well-chosen messages, which are more adjusted to individual patients and aimed at changing their attitudes and behaviour. In the interaction model, family doctor and patient learn from each other by means of interaction. The advantage of the last model is that it offers the opportunity for tailoring, that is, any combination of information or change strategies intended to reach one specific person, based on characteristics that are unique to that person, relating to the outcome of interest and derived from an individual assessment (Kreuter & Skinner, 2000).

The choice of type of communicative behaviour or communication style may have an influence on the choice of communicative model. In the interaction model, family doctors may tailor the information needs of their patients. We wonder whether these arrangements in general communicative behaviours, general communication styles or communicative models are also applicable in general practice where the topic nutrition is concerned.

NUTRITION COMMUNICATION

First, the patients' perspective on nutrition communication will be discussed. Then, the focus shifts to the family doctors' perspective on nutrition communication. Subsequently, the two perspectives will be integrated in nutrition interaction between family doctors and patients. Finally, the conditions for more effective nutrition communication will be described.

Patients' perspective on nutrition communication

Generally speaking, health professionals are often perceived as credible sources, because of their expertise (the level of source's knowledge of the discussed topic, established by education, training and experience in the field) and trustworthiness (the source can be expected to provide an objective or unbiased perspective on the topic and is willing to help patients with their diverse questions) (Benoit & Stratheman, 2004). The question remains as to whether this is also the case for nutrition in particular. A pan-European study on nutrition information sources showed that there is general agreement about the source of information on healthy eating that people mainly use and trust, namely, the health professionals (De Almeida et al., 1997). Hiddink et al. (1997a) showed that consumers preferred family doctors as a source of nutrition information over ten other potential sources. Furthermore, the level of perceived expertise of the family doctors was among the highest. Only the dietician and the Netherlands Food and Nutrition Education Bureau had a slightly higher perceived expertise.

The conclusion is that patients have a favourable attitude towards nutrition communication through family doctors. The relative importance of differential nutrition information sources has changed over the past ten years. The monitoring of known nutrition information sources from time to time is important. During the last five years, the Internet has taken a huge leap. The Internet has improved as a result of technological developments and accessibility. Nowadays, information at web-sites is better arranged, since several organisations have developed well-ordered web-sites that are more consumer-friendly. Due to such societal changes, there is a need for an up-to-date study about nutrition information sources, including new sources such as the Internet.

Family doctors' perspective on nutrition communication

Dutch family doctors generally agreed that nutrition is important in clinical practice and that they as family doctors should provide nutrition information to patients, but they did not provide nutrition information to a great degree. Furthermore, family doctors perceived strong barriers to being involved in nutrition issues in their practice, for example, lack of time, lack of education, and family doctors' perception of patients lacking the motivation to change their lifestyle (including nutrition behaviour) (Hiddink et al., 1995).

An American study also showed that physicians appreciated the importance of nutrition, but did not know how to implement these concepts in practice (Kushner, 1995).

Accordingly, family doctors were reluctant to fulfil their role as provider of nutrition information. Only few studies have assessed what family doctors actually do in their busy practice.

Introduction

One family doctor may provide information about nutrition to a patient, while another may refer a patient to a dietician, when a nutrition problem is involved. Communication styles may play a role here and more research is definitely needed.

Nutrition interaction between family doctors and patients

According to the Ottawa Charter, health professionals need to move increasingly in the health promotion direction, beyond their responsibility for providing clinical and curative services (Koelen & Van den Ban, 2004). Over recent years, government has stated that primary care is an ideal setting in which to provide nutrition education to the public (Moore et al., 2000). Family doctors are becoming more and more the central gatekeepers to healthy lifestyles. Research on nutrition communication showed a mixed picture. Moreover, as previously mentioned, patients expected nutrition communication from their family doctors on the one hand (Hiddink et al., 1997a). On the other hand, as we saw, family doctors perceived strong barriers to providing nutrition information (Hiddink et al., 1995). When nutrition communication is at stake in general practice, the end result is tension. This situation calls for a two-sided approach. Therefore, we shall explore in-depth both the perspective of patients and the perspective of family doctors. Finally, we shall integrate both perspectives.

There are several opportunities for nutrition interaction in general practice. However, this does not mean that all opportunities are utilised. The first opportunity consists of non-medicament advice, which is a fixed part of the therapeutic actions of family doctors. General practice is characterised by both personal and longitudinal features, which are reflected in knowledge of family history and continuity of care (Van Weel, 2003). Many patients, from nearly all segments of the population (including the hard-to-reach), visit their family doctor one or more times per year, and then have the opportunity to evaluate given advice. In 2000, Dutch patients had on average 6.2 contacts with general practice yearly. Contact frequency is highest for the elderly (Jabaaij, 2001). Dutch consultations take about ten minutes (Van den Brink-Muinen et al., 2003). Furthermore, patients at high risk of chronic diseases (for example, the nutrition-related diseases diabetes mellitus and hypertension) are obliged to visit their family doctor periodically and therefore they are an important target group for nutrition communication (Van Binsbergen & Ocké, 2001). Moreover, as previously mentioned, family doctors have the highest referral scores as nutrition information sources and have a high level of perceived expertise. One might argue that family doctors are not specifically educated to provide nutrition information. However, they could keep basic information and co-operate with other health professionals for more specific information.

There were multiple opportunities, but there were also problems. Unfortunately, there is currently a mismatch between the attitude of patients, who appear willing to accept dietary advice from family doctors, and the reluctance on the part of these professionals to fulfil this role (Moore et al., 2000). Family doctors are not aware of the fact that patients expect to receive nutrition information from them not only when they are ill, but also in respect of prevention (Hiddink, 1996). Of course, this will influence the nutrition communication process. For example, family doctors may respond to patients indifferently. Moreover, if patients feel that their own expectations clash with family doctors' expectations, their established relationship may be harmed. As a consequence, patients feel unsatisfied and respond with non-compliance with prescribed regimens (Di Nicolla & Di Matteo, 1984). In addition, family doctors have their own strategies for providing nutrition information, but often they do not know how to cope with critical questions from increasingly demanding consumers (Van Woerkum, 1999). Their interventions in nutrition behaviour often lack a theoretical basis. Effective nutrition communication is based on appropriate theories from communication sciences and social psychology (Contento et al., 1995). Moreover, information supply is not sufficient to achieve internal motivation for behavioural change. There should be interaction between family doctor and patient. Where interaction takes place, family doctor and patient actively share information with each other, and they co-operate in the treatment of the complaint (for example, change of nutrition behaviour) (Van Woerkum, 1999; Van Binsbergen & Ocké, 2001).

The above-mentioned factors suggest that nutrition communication through family doctors is very meaningful but, in the daily practice of most family doctors, this nutrition communication between family doctor and patient is not optimal (Van Binsbergen & Ocké, 2001; Hiddink et al., 1995; Van den Hogen et al., 1996). Therefore, communicative characteristics (for example, knowledge, beliefs, attitudes, motivations and behaviour) of both conversation partners will be studied to obtain insights into the perspective of both patients and family doctors in order to provide recommendations for more effective nutrition interaction.

Conditions for effective nutrition communication

In a comprehensive review, Contento et al. (1995) examined the effectiveness of nutrition communication research interventions, conducted with preschool children, school-aged children, adults, pregnant women and caregivers of infants, and older adults. The review included 220 studies undertaken between 1980 and 1995. In 2002, they carried out a review of 350 studies, 130 of which were conducted since 1995 (Contento et al., 2002). This review provides evidence that nutrition

education can be effective in changing dietary behaviour, even though there is variability in outcomes. Intervention strategies that have been identified from research as contributing most strongly to nutrition communication effectiveness are as follows: they (1) are behaviourally focused; (2) address personal relevant motivators; (3) use active interpersonal strategies; (4) use tailoring; (5) take account of stage of dietary change; (6) use non-traditional channel; (7) enhance direct involvement with food; (8) take care of long-term maintenance of change. Below these conditions will be clarified.

1. Behaviourally focused

First, given the evidence that nutrition communication is more likely to be effective when it is behaviourally focused, changes in nutrition behaviour would appear to be the primary outcome of choice for intervention. Promoting behavioural change is considered more important than merely transferring knowledge. To realise behavioural change, the Stages of Change Model (Prochaska & Velicer, 1997) might be helpful.

2. Address personal relevant motivators

Next, attention to determinants, such as motivators and reinforcers with personal relevance among consumers, is crucial. In this context, Green and Kreuter's (2005) Precede-Proceed Model is essential. These authors distinguished predisposing, reinforcing and enabling factors. Predisposing factors relate to the motivation of an individual to act, including knowledge, values, beliefs, attitudes, and perceived needs and abilities. Reinforcing factors include social support, peer influences, and advice and feedback by health professionals. Enabling factors are conditions, including new skills, availability, accessibility and affordability of health care.

3. Use active interpersonal strategies

The change is most successful when an active interpersonal intervention strategy is used. One might systematically incorporate self-assessment compared to a standard, goal-setting, social support, small groups and involvement of family. With respect to accurate self-assessment, a lot of people are not aware of their own personal risk behaviour regarding nutrition, and therefore they feel no need to change. Lack of awareness seems to play a role here (Brug et al., 1994). Awareness is a concept of the Precaution Adoption Process Model (Weinstein, 1988) and the Stages of Change Model (Prochaska & Velicer, 1997). However, no clear definition of nutrition awareness is given in the literature. Also, it remains unclear which factors contribute to nutrition awareness.

4. *Use of tailoring*

The fourth criterion involves the use of tailoring, which means that interventions are geared to an individual. Tailoring increases the attention for the message. Interventions could be personalised through the use of the name and personal characteristics of the receiver (Brug et al., 1998).

5. *Take account of stage of dietary change*

Interventions that take account of the stage of dietary change are more successful. Strategies that increase motivation might move individuals from the precontemplation stage (not yet aware of risk behaviour) to the contemplation stage (aware of risk behaviour) (Prochaska & Velicer, 1997).

6. *Use non-traditional channel*

Moreover, a variety of non-traditional channels are promising. Of course, the Internet can be seen as a non-traditional channel, but other channels, such as motivational interviewing, might also be useful. The aim of motivational interviewing is to facilitate behavioural change by helping patients to explore and resolve their ambivalence about the behaviour change (Britt et al., 2004). The 5As construct (Assess, Advise, Agree, Assist and Arrange follow-up) provides a conceptual framework for describing, delivering and evaluating health behavioural counselling interventions in primary care (Goldstein et al., 2004).

7. *Enhance direct involvement with food*

The seventh criterion concerns the enhancement of direct involvement with food, such as cooking. In addition to health consequences, there were other considerations that influence food choice, such as taste reflections and food safety concerns.

8. *Take care of long-term maintenance of change*

Finally, behavioural change is only useful if it can be maintained for a long time. An important condition is the availability of a good monitoring system.

It can be concluded that effective interventions are *behaviourally focused, and based on prior research and appropriate theory*. Elder et al. (1999) in their review highlight several theories and models about behavioural change that could be helpful for health professionals in optimising the effectiveness and efficiency of their interactions with patients. Examples of such theories are the Stages of Change Model, Social Cognitive Model (cognition affects behaviour), social support

Introduction

theories (reinforcement offered by social networks) and self-management models (reinforcement of actions to change using one's own resources). Glanz et al. (2002) tried to understand both the theories and their application in a variety of settings, such as health care. Ten theories or models clearly emerged as the most often used. The first two, and by far the most dominant, were Social Cognitive Theory and the Stages of Change Model. The remainder of the top ten theories and models were: the Health Belief Model (health beliefs affect health behaviour), social support, patient-provider communication (interpersonal communication affects health behaviour), the Theory of Planned Behaviour (attitudes, social influence and self-efficacy affect intention and behaviour), stress and coping (processes of dealing with stressful events), community organisation (target group identifies and addresses its own health problems), ecological models (multiple levels of environmental factors affect health behaviour) and Diffusion Theory (process of communicating a new idea to users).

It can be concluded that the conditions for effective nutrition communication should be included when studying nutrition communication between family doctors and patients. These conditions should be reconsidered in order to discover essential elements for more effective nutrition communication between family doctors and patients.

MAIN OBJECTIVE AND RESEARCH QUESTIONS

It is not so long ago that nutrition communication came under the spotlight for the first time. The first publication on this subject in the Netherlands appeared around 1988 (Van Dusseldorp et al., 1988). Several developments have taken place in the meantime, including changing roles of family doctors and patients, the rise of the Internet, and the problem of overweight and obesity. These changes are potentially important for effective nutrition communication in general practice.

The main objective of the study presented in this thesis is to provide recommendations for more effective nutrition interaction between family doctor and patient.

To achieve this main objective, we chose a two-sided approach, taking into account the perspective of patients and the perspective of family doctors.

The general research questions were:

1. What are the communicative characteristics (e.g. knowledge, beliefs, attitudes, motivations and behaviour) of patients regarding nutrition communication through family doctors?
2. What are the communicative characteristics (e.g. knowledge, beliefs, attitudes, motivations and behaviour) of family doctors regarding nutrition communication towards patients?

3. How can we integrate both the perspective of patients and the perspective of family doctors in order to provide recommendations for more effective nutrition interaction?

To obtain insight into the perspective of patients, a combination of qualitative and quantitative studies was used. The aim of the qualitative study among consumers was to explore consumers' perceptions regarding nutrition communication through family doctors in general. Qualitative results were used as input for the quantitative study. In addition, a hypothetical model was developed in order to test it in the quantitative study. In the quantitative study among consumers, their perceptions regarding nutrition communication through family doctors were assessed.

To understand the perspective of family doctors, both qualitative and quantitative methods were used, analogous with the consumer studies. The aim of the qualitative study among family doctors was to explore family doctors' perceptions regarding nutrition communication towards consumers. Analogous with the consumer studies, qualitative data were used as input for the quantitative study. Moreover, a hypothetical model was developed in order to test this model in the quantitative study. Furthermore, family doctors' perceptions regarding nutrition communication towards consumers were assessed in the quantitative study.

Finally, both the perspective of patients and the perspective of family doctors were integrated in order to provide recommendations for more effective nutrition interaction. In addition, we were able to write a review in which we provided an overview of the state of the art regarding nutrition communication in general practice. This review was carried out after the empirical studies were finished, namely, in 2005. We selected articles written between 1995 and 2005, including articles from the Fourth Heelsum International Workshop held in 2004 (Truswell, 2005). In this way, we were better able to situate our results in order to provide contemporary recommendations for more effective nutrition communication in general practice.

OUTLINE OF THESIS

Chapter 2 provides a literature review on nutrition communication in general practice. Next, the results of the qualitative consumer study are described. Nutrition behaviour is rather complex. A problem is that the majority of consumers believe they are eating healthily, but in fact they are not. Little research has been done on this so-called lack of nutrition awareness and its correlates. Therefore, a hypothetical model for nutrition awareness is developed, including socio-demographic and psycho-social variables (Chapter 3). In the quantitative study among consumers, the focus shifts to nutrition information seeking behaviour. Perceived relevance and information needs regarding

Introduction

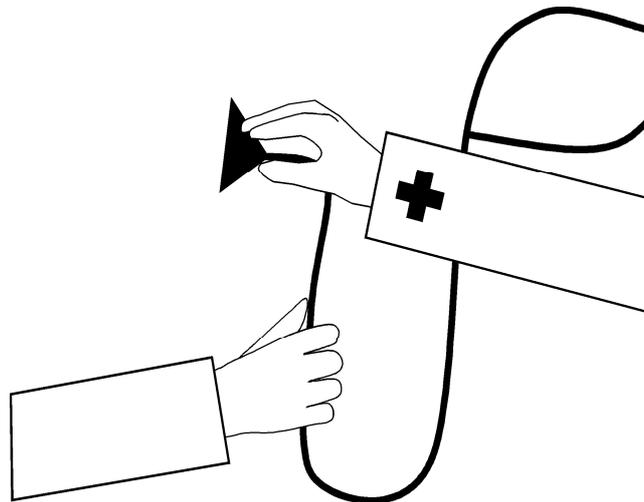
food topics and preferred nutrition information sources among consumers are assessed and reported in Chapter 4. Furthermore, the concept of nutrition awareness is unravelled and its socio-demographic and psycho-social correlates are assessed. The final model for nutrition awareness is described in Chapter 5. Next, perceptions of family doctors regarding nutrition communication towards consumers are studied. In the qualitative study among family doctors, five specific nutrition communication styles of family doctors are identified (Chapter 6). In addition, a hypothetical model for nutrition communication style is developed, including socio-demographic and psycho-social variables. In the quantitative study among family doctors, our hypothetical model for nutrition communication style is tested (Chapter 7). Finally, the main conclusions and recommendations for more effective nutrition interaction between family doctors and patients are formulated in Chapter 8.

NOTE

In this thesis, several broad concepts will be used. The term ‘consumer’ refers to everybody who makes use of health care facilities, being a member of the population. The term ‘patient’ refers to a person who visits his family doctor with a health complaint. The term ‘family doctor’ is used in the introductory chapter and conclusions and discussion chapter. In other chapters, comparable terms, such as ‘general practitioner’, are used, due to obligation to journals. In this thesis, family doctor, patient and consumer were referred to using the personal pronouns ‘he’, ‘him’ and ‘his’ for reasons of readability.

CHAPTER 2

AN OVERVIEW OF NUTRITION COMMUNICATION IN GENERAL PRACTICE



Based on:

Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Nutrition communication in general practice. *Review submitted for publication.*

ABSTRACT

Family doctors are frequently confronted with patients who suffer from obesity or other nutrition-related diseases, such as diabetes and coronary heart disease. There is increasing evidence that nutrition communication is effective in changing nutrition behaviour. Moreover, it is widely argued that family doctors are ideally placed to provide nutrition information.

The aim of this review is to provide an overview of the state of the art regarding nutrition communication in general practice. First, an overview of the occurrence of nutrition communication in general practice is provided. Next, it is established that patients' perceptions regarding nutrition communication through family doctors are positive. Although there are many opportunities for nutrition communication in general practice, these opportunities are often not taken up. Even though family doctors' perceptions regarding nutrition communication are positive, they also perceive barriers, such as lack of time and patient non-compliance.

In Chapter 8, we shall complement the results of this review with the results of our own empirical studies regarding nutrition communication between family doctors and patients (Chapter 3, 4, 5, 6 and 7) in order to provide contemporary recommendations for more effective nutrition communication between family doctors and patients.

Keywords: Nutrition communication, general practice, primary care, obesity, attitude.

INTRODUCTION

In 2001, the prevalence of obesity (Body Mass Index (BMI) \geq 30) in American adults was 21%. Mokdad et al. (2003) showed a continuing increase of obesity in all age groups. Obesity is strongly associated with several major health risk factors. Not only in the United States, but also in other industrialised countries, obesity is increasing. Overweight (BMI) \geq 25.0) occurs in 40% of Dutch adults, of whom 10% can be classified as obese (BMI \geq 30.0) (Visscher et al., 2002). Since 2000, obesity has been considered as a disease by the World Health Organisation (WHO, 2000). Obesity has become one of the most important, but also most difficult, health problems. A substantial health gain can be obtained even with a 10 to 15% weight loss (Mathus-Vliegen, 1998). Lifestyle factors, including nutrition, play a role here. Many other diseases, such as type 2 diabetes mellitus and coronary heart disease, are nutrition-related too.

Family doctors are frequently confronted with patients who suffer from nutrition-related diseases. In several guidelines of the Dutch College of General Practitioners, nutritional elements are included (Van Binsbergen & Drenthen, 2003). Nutrition advice is an important aspect of primary care, but unfortunately there is insufficient use of available resources (Van Weel, 2003). Moreover, family doctors from different countries work under different conditions, and these conditions affect their ability to communicate about nutrition. For example, in the Netherlands, the United Kingdom and Canada, patients are registered with one doctor, whereas there is no formal attachment to one doctor in the United States and Australia (Truswell et al., 2003). The review of Contento et al. (1995) provides evidence that nutrition communication is effective in changing nutrition behaviour. Among other things, the use of active interpersonal strategies has been identified as contributing strongly to nutrition communication effectiveness.

In 1988, Van Dusseldorp et al. carried out the first study on nutrition communication in general practice. Nutrition was discussed in 14% of the consultations between Dutch family doctors and patients. Specifically, nutrition was frequently discussed in relation to complaints, such as obesity, stomach disorders, hypertension, diabetes mellitus, gastero-enteritis and the common cold. In about half of the contacts, nutrition communication was initiated by the family doctor and, in the other half, the patient brought nutrition up in the discussion (Van Dusseldorp et al., 1988). Ten years ago, Hiddink et al. (1995) argued that there seemed to be a gap between the views of GPs and patients with respect to nutrition communication. In studies undertaken before 1995, the role of family doctors in nutrition communication was often assessed from a negative point of view by only addressing barriers and not predisposing factors and driving forces. As a result, family doctors have

a low involvement in nutrition (Hiddink et al., 1995). We took the studies of Hiddink et al. (1995/1997a/1997b/1997c/1997d/1999) as a starting point for this review. We expect that things have changed since these studies. First of all, there are new food topics to be discussed, such as food safety, genetic modification of food and functional foods. Moreover, increases in the prevalence of obesity have led to increased attention for nutrition communication. Furthermore, new media have been developed, such as the Internet, which might have an influence on nutrition communication between family doctors and patients.

Therefore, this review will focus mainly on recent studies about nutrition communication in general practice, incorporating publications from 1995 to 2005. For each topic, we will provide a chronological overview, starting with the oldest study and ending with the latest. The aim of this review is to provide an overview of the state of the art regarding nutrition communication in general practice. In Chapter 8, we shall complement these results with the results of our own empirical studies regarding nutrition communication between family doctors and patients (Van Dillen et al., 2003/2004/2005a/2005b/2005c). As a result, we shall be better able to situate the results of our own empirical studies in order to provide contemporary recommendations for more effective nutrition communication in general practice.

First, we shall search for publications with factual information about the occurrence of nutrition communication in general practice. Moreover, we shall explore the patients' perspective, including patients' perceptions and patients' complaints that lead to nutrition communication. Furthermore, the family doctors' perspective will be explored, including family doctors' perceptions and strategies regarding nutrition communication. Finally, some conclusions will be drawn from this review, and contemporary recommendations for more effective nutrition communication in general practice will be provided.

OCCURRENCE OF NUTRITION COMMUNICATION IN GENERAL PRACTICE

With respect to the occurrence of nutrition communication in general practice, publications about family doctors' actual nutrition communication behaviour will first be described. Moreover, factual information about the duration of nutrition communication will be discussed. Also, results will be presented that reflect the contribution of patients and/or family doctors in initiating nutrition communication. Finally, some conclusions about the occurrence of nutrition communication in general practice will be drawn. Comparisons should be made with caution, due to differences

between countries, differences between measurement methods, differences between patients' self-reports and family doctors' self-reports, and differences between indicators.

Family doctors' actual nutrition communication behaviour

With respect to family doctors' actual nutrition communication behaviour, several studies were found. The first series of studies concern the percentage of family doctors who self-reported that they had provided nutrition information to their patients. The second series of studies concern the percentage of patients who self-reported that they had received nutrition communication from their family doctors. The third series of studies concern the percentage of consultations in which nutrition was discussed by family doctors.

To start with the first series of studies about the percentage of family doctors who provided nutrition information to their patients, data were obtained by self-reports of family doctors.

Nine studies were based on self-reports of family doctors. To start with the study of Hiddink et al. (1995), 28% of Dutch family doctors provided daily nutrition information to about 10% of their patients, and 48% to about 5% of their patients. This means that about three-quarters gave nutrition information to 1-6 patients a day. Over two third of American family doctors provided dietary counselling to 40% or less of patients (Kushner, 1995). This is in agreement with another American study in which two thirds of physicians reported that they personally provided nutrition counselling for their patients (Glanz et al., 1995). Nevertheless, only 6% of American family doctors included nutrition counselling in the majority (>50%) of patient encounters, while 19% incorporated nutrition counselling in less than 10% of office visits (Eaton et al., 2002). Thirty-eight percent of Danish family doctors were contacted daily by patients with diseases or symptoms related to diet, but only 30% of family doctors said they gave dietary advice once a day or more (Holund et al., 1997). In Germany, 65% of family doctors provided special nutrition counselling programs to their patients (Wiesemann, 1997). A strikingly high 98% of British family doctors were occasionally up to always obtaining information about nutrition from their patients (McAvoy et al., 1999). Nicholas et al. (2005) found that 97% of Australian family doctors self-reported that they provided some nutrition counselling. 'Some', however, is not very specific. One study assessed nutrition communication as well as weight communication in particular. In an American study, 43% of physicians self-reported undertaking nutrition counselling, and 50% self-reported counselling patients at least yearly with regard to weight. Of physicians who counselled frequently on nutrition, 90% also frequently counselled on weight. Family doctors were more likely than other physicians to provide nutrition and weight counselling (Frank et al., 2002).

The second series of studies focused on the percentage of patients who received nutrition communication from their family doctors.

Seven studies based on self-reports of patients were found. One fourth of American patients mentioned that their family doctor asked about diet or nutrition, whereas one fifth of patients reported that family doctors recommended diet (Lazarus, 1997). Twenty-three percent of American patients reported having received advice to change dietary habits from their family doctor (Thomas et al., 2002). According to Honda (2004), 21% of American patients received family doctors' advice on diet. In another American study, the percentage was still higher: discussion of diet was recalled by 44% of the patients (Flocke & Stange, 2004). An international survey in five countries (Australia, New Zealand, the United Kingdom, Canada and the United States) about patients' experience in primary care found an overall lack of emphasis on prevention. Only 28% of British patients reported receiving advice from their family doctors on weight, nutrition and exercise, compared to 52% in the United States, 45% in Canada, 38% in Australia, and 33% in New Zealand (Schoen et al., 2004). Thirteen percent of patients reported that they discussed diet in UK primary care (Moore & Adamson, 2002). An American study focused on weight communication in particular. Two thirds of patients reported that in the past their family doctor had told them they were overweight and discussed the health benefits of weight loss; only one third reported that their family doctor had ever given them specific advice on how to lose weight (Simkin-Silverman et al., 2005).

The third series of studies concerned the percentage of consultations in which nutrition was discussed by family doctors. In several studies conducted before 1995, diet came up for discussion in 14-28% of consultations (Hiddink et al., 1997c). Percentages were obtained by using either observations or self-reports.

Six studies were observational studies. It is estimated that 1 in 6 consultations in Dutch routine practice focused on diet as a main intervention (Van Weel, 1997). Nutrition was discussed in 60% of the visits between Canadian family doctors and patients (Beaudoin et al., 2001). However, the overall prevalence of nutrition counselling in a study using direct observation of American family doctors was 24% (Eaton et al., 2002). Dietary habit counselling was observed in 25% of encounters between American family doctors and patients (Anis et al., 2004). In another American study, diet was observed in 21% of the visits (Flocke & Stange, 2004). Another American study focused on weight communication in particular. Excess weight was mentioned in 17% of encounters with American overweight patients, while weight loss counselling occurred with 11% of overweight adults (Scott et al., 2004).

Percentages of consultations in which nutrition was discussed were also obtained by way of self-reports. Two studies based on self-reports were found. When asked about the frequency with which they gave nutrition advice, Australian family doctors self-reported that they gave such advice in 15% of consultations (Helman, 1997). Australian family doctors reported providing dietary counselling on average in 15% of their consultations each month (Richards & Mitchell, 2001).

It can be concluded that results about family doctors' actual nutrition communication behaviour differ widely, depending on differences between countries, differences in measurement methods, differences between patient's self-reports and family doctors' self-reports, and differences between indicators. In general, percentages of family doctors' actual nutrition communication behaviour were the highest in the United States. A possible reason might be that Americans suffer from more nutrition-related health complaints. The abundance of food has led to very high percentages of obesity in the United States. However, American family doctors might also have received more nutrition education in their vocational training or they might have received more nutrition information from national education offices. Furthermore, differences in family doctors' actual nutrition communication behaviour can be related to differences in measurement methods. Observational studies revealed different results than studies based on self-reports. Moreover, there were differences between self-reports of patients and self-reports of family doctors. There was a discrepancy between the average percentage of family doctors who self-reported giving nutrition communication (approximately 60%) and the percentage of patients who self-reported having received nutrition communication (approximately 30%). However, the percentage of consultations in which nutrition communication was observed was slightly lower (approximately 25%), whereas the percentage of consultations in which family doctors self-reported nutrition communication was still lower (approximately 15%). Finally, there were also huge differences in indicators. Some studies used answer categories which were not very distinctive, in that they were too broad.

Duration of nutrition communication

Only few studies assessed the exact duration of nutrition communication during consultation, using either observations or self-reports.

Two studies used observations. The average time spent on nutrition counselling in the United States was approximately one minute, ranging from <20 seconds to >6 minutes. Visits that included nutrition counselling were longer, at 12.8 minutes compared to 9.8 minutes, than those that did not include nutrition counselling (Eaton et al., 2002). Another American study showed that family

doctors who discussed diet with their patients spent less than one minute doing so (range of 0.3-6.7 minutes) (Flocke & Stange, 2004).

Three studies used self-reports. Based on survey results of American family doctors, Glanz et al. (1995) found that 70% of family doctors reported that they discussed dietary change for five minutes or less, with only 9% counselling patients for nine minutes or longer. Kushner's (1995) study showed that American family doctors spend five or fewer minutes discussing dietary changes. Australian family doctors reported spending an average of eight minutes discussing dietary change with patients, but reported they would prefer to spend 15 minutes (Richards & Mitchell, 2001).

It can be concluded that time spent on nutrition communication per consultation varies. The lowest time spent on nutrition communication appeared to be 20 seconds. This is rather short to provide solid advice on nutrition, and it might be possible that these family doctors directly referred to another health professional for comprehensive nutrition advice. The highest time spent on nutrition communication appeared to be nine minutes. This is rather long, if one notes that the average consultation time is about ten minutes. It might imply that family doctors who are acting in this way had applied the interaction model. In this model, patient and family doctor learn from each other by means of interaction. As mentioned below, it is not so strange that family doctors perceived lack of time as an important barrier to providing nutrition information. Furthermore, obesity has become widely discussed as a general concern, so if family doctors raise the subject, they now have society on their side (Truswell et al., 2005).

Contribution of patients and/or family doctors in initiating nutrition communication

As Hiddink et al. (1997a) mentioned in their article, the initiative was equally divided between family doctor and patient in a study undertaken before 1995. Of all visits observed, family doctors initiated dietary habits counselling over three times as often as patients did (Anis et al., 2004). In Australia, most nutrition advice was initiated by the family doctor (69%) and was disease-specific rather than being general information on healthy eating. In 31% of consultations, the issue of nutrition was initiated by the patient (Helman, 1997).

It can be concluded that family doctors mainly took the initiative to discuss nutrition with their patients.

Conclusions with respect to occurrence of nutrition communication in general practice

The occurrence of nutrition communication in general practice, as revealed in the literature review, was measured using different measurement methods. This makes it difficult to compare results, especially the percentages of family doctors' actual nutrition communication behaviour. Estimates of these percentages varied. Higher percentages were found in studies based on direct observation than in studies based on self-reports. Moreover, there were also differences between family doctors' self-reports and patients' self-reports. Studies based on self-reports of family doctors revealed that the majority of family doctors provided nutrition information to their patients. Yet, studies based on self-reports of patients showed that only a minority reported having received nutrition information from their family doctor. This discrepancy may imply that family doctors possibly overestimate their actual nutrition communication behaviour. However, patients may underestimate family doctors' actual nutrition communication behaviour if they do not listen carefully to their family doctors.

Furthermore, we conclude that there were differences in family doctors' actual nutrition communication behaviour between countries. In the Netherlands, the percentage of consultations in which nutrition is discussed is around 15%. However, in America and other countries in which the problem of obesity is huge, there is a nutrition-related reason for almost 25% of all visits to family doctors.

Moreover, nutrition communication takes about five minutes per consultation. In countries where patients are registered with one family doctor, it is much easier to give nutrition advice step by step over time. After all, behaviour change is a process that takes time (Truswell et al., 2003).

Furthermore, it can be concluded that family doctors are the main initiators of nutrition communication.

PATIENTS' PERSPECTIVE

With regard to the patients' perspective, we shall describe studies about patients' perceptions regarding nutrition communication through family doctors in general, and patients' complaints that lead to nutrition communication. Finally, conclusions about the patients' perspective regarding nutrition communication in general practice will be drawn.

Patients' perceptions regarding nutrition communication

By patients' perceptions regarding nutrition communication, we mean the views of patients regarding the fact that family doctors provide nutrition information. Studies about patients' perceptions regarding nutrition communication through family doctors were looked at, including preferred nutrition information sources, use of nutrition information sources, and perceived expertise and reliability of family doctors as a nutrition information source.

Preferred nutrition information sources and actual use

Two studies explored the preferred nutrition information sources among patients. A survey among Dutch patients showed that they preferred family doctors as a source of nutrition information over ten other potential sources (Hiddink et al., 1997a). American patients expected dietary advice and guidance from their family doctors that would help them avoid risk factors and prevent disease (Glanz, 1997).

Three studies assessed the actual use of nutrition information sources. A survey in 15 European countries showed that the five sources of information most frequently mentioned were television/radio, magazines and newspapers, health professionals, food packages, and relatives/friends (De Almeida et al., 1997). British patients mentioned that most nutrition information came from the media, whereas health professionals were mentioned less frequently as a source of information than the media (Buttriss, 1997). This was in contrast with a Croatian study in which most patients were given advice on diet by their family doctor, followed by family members and medical nurses. Patients who were overweight were advised more by family doctors than by family members (Pavlekovic & Brborovic, 2005).

It can be concluded that most patients prefer family doctors as a source for nutrition information. When it comes to actual use of nutrition information sources, both the media and health professionals were mentioned.

Perceived expertise and reliability of family doctors

Six studies assessed the expertise and reliability of nutrition information sources as perceived by patients. The level of perceived expertise of the family doctor is among the highest in Dutch patients. The dietician and Food and Nutrition Education Bureau had slightly higher perceived expertise (Hiddink et al., 1997a). A pan-European survey on attitudes on food showed that the most trusted sources of information in almost all countries were health professionals and government agencies (De Almeida et al., 1997). The majority of British patients said that a conversation with

their family doctor was a source of advice they trusted. Advice of health professionals was more likely to be of use, whereas the credibility of the media was perceived as low (Buttriss, 1997). American patients looked on physicians as good and credible sources of health information (Glanz, 1997). In Spain, physicians were found to be the most reliable source of nutrition information, followed by nurses, pharmacists and TV programmes (Serra-Majem et al., 1999). Australian patients viewed family doctors as part of a set of traditional health information providers, quite distinct from the commercial mass media. When it comes to the reliability of New Zealand family doctors as sources of nutrition information, medical practitioners appear to be highly regarded, along with dieticians (Worsley, 1999).

To conclude, patients perceive family doctors as reliable and expert nutrition information sources.

Patients' complaints leading to nutrition communication

By patients' complaints, we mean their medical conditions. Patients' complaints leading to nutrition communication were assessed, using either observations or self-reports.

Only one study was based on observations. American family doctors focused on nutrition counselling more frequently during well care visits (41%) and chronic illness visits (30%) than during acute illness visits (17%). Specifically, nutrition counselling occurred in 45% of visits in diabetes, 25% of visits in post-myocardial infarction or stroke, 31% of visits for hypertensive patients, 26% of prenatal visits, and 33% of visits to obese patients (BMI>30)(Eaton et al., 2002).

Three studies made use of self-reports. The three most prevalent conditions for which British family doctors self-reported that they were likely to give dietary advice were hypertension, functional digestive disorders and ischaemic heart disease (Mant, 1997). The main complaints for which advice was given by Australian family doctors were heart disease, hyperlipidemia, obesity and diabetes (Helman, 1997). The majority of Australian family doctors reported that they strongly agree to provide nutrition counselling for diabetes (79%), lipid disorders (71%), and obesity (68%), but the same could not be said for hypertension (22%), ischaemic heart disease (46%), and overweight (45%) (Nicholas et al., 2005).

To conclude, obesity and diabetes are the main medical conditions for which family doctors discuss nutrition.

Conclusions with respect to the patients' perspective

It can be concluded that perceptions of patients regarding nutrition communication through family doctors are positive. Although most patients preferred family doctors as a nutrition information source, the media were also often mentioned. Patients perceived family doctors as a reliable and expert nutrition information source. Moreover, patients expected nutrition communication from their family doctors. However, if patients were unsatisfied with the nutrition information provided by family doctors, they could use the Internet. Motives for using the Internet were lack of information received from family doctors, uncertainty about the advice received from family doctors, freedom to discuss health problems in which face-to-face interaction with family doctors was considered embarrassing, and a search for information for other people (Van Woerkum, 2003).

Finally, patients' complaints frequently leading to nutrition communication were obesity and diabetes, and their co-morbidities.

To conclude, the patients' perspective regarding nutrition communication through family doctors seems to be favourable.

FAMILY DOCTORS' PERSPECTIVE

With respect to the family doctors' perspective, we shall describe studies about family doctors' perceptions regarding nutrition communication. In addition, family doctors' strategies regarding nutrition communication will be discussed. Finally, we shall provide some conclusions with respect to the family doctors' perspective regarding nutrition communication in general practice.

Family doctors' perceptions regarding nutrition communication

By family doctors' perceptions regarding nutrition communication, we mean the views of family doctors regarding the fact that family doctors provide nutrition information for patients in general. We searched for studies about family doctors' attitudes towards nutrition communication, family doctors' self-efficacy to provide nutrition information, and family doctors' perceived barriers regarding nutrition communication.

Family doctors' attitudes towards nutrition communication

In general, family doctors have a positive attitude towards the nutrition guidance of their patients (Hiddink et al., 1995). Several studies were found that specifically assessed task perception, nutrition interest, and expectations regarding nutrition communication.

Eight studies revealed family doctors' *task perception*. These were studies that focused on task perception of prevention. Seventy-six percent of Dutch family doctors confirmed that nutrition information is a part of their task, including at individual prevention level. However, they perceived their task in nutrition information to be more at secondary or tertiary level (90% positive answers) rather than primary prevention (60% positive answers) (Hiddink et al., 1995). Task perception was a major determinant of actual nutrition communication behaviour (Hiddink et al., 1997b/1997d). Two thirds of Croatian family doctors recognised their role in individual work with patients in tertiary prevention, but less in work on primary and secondary prevention (Pavlekovic & Brborovic, 2005). There were a couple of studies that concentrated on task perception of nutrition. Nearly three-quarters of American family doctors felt that dietary counselling was important and the responsibility of the family doctor, but it was unclear how often this responsibility manifested itself in action (Kushner, 1995). Ninety percent of Danish family doctors considered dietary counselling as a part of their task (Holund et al., 1997). The majority of Scottish family doctors agreed that nutrition had an important role to play in the management of disease and that they could offer nutrition advice to patients (Eley Morris et al., 1999). Over three-quarters of Australian family doctors agreed that nutrition counselling was part of their role (Richards & Mitchell, 2001). More specifically, three-quarters of American family doctors agreed that family doctors should provide periodic counselling regarding the dietary intake of fat and cholesterol. More than half of the family doctors agreed with periodic counselling about dietary energy intake, carbohydrates and fibre intake, and sodium intake (Soltesz et al., 1995a). There was also a study that focused on task perception of overweight. Seventy-three percent of Israeli family doctors reported that they believed it was part of their role to counsel overweight or obese patients on the risks of obesity, even in the absence of other cardiovascular risk factors (Fogelman et al., 2002).

Seven studies that studied *nutrition interest* among family doctors were found. Seventy percent of Dutch family doctors expressed considerable interest in the role of nutrition in health and 25% said they were neutral in this aspect (Hiddink et al., 1995). An active interest in the effect of nutrition on health and disease was a major determinant of family doctors' actual nutrition communication behaviour (Hiddink et al., 1997b/1997d). Moreover, nutrition interest appeared to be just as important a determinant in cross-sectional and longitudinal situations (Hiddink et al., 1999). Ninety-two percent of German family doctors attributed great importance to nutrition in particular (Wiesemann, 1997). Likewise, the proportion of Swiss physicians rating nutrition counselling as being important or somewhat important was 93% (Cornuz et al., 2000). Nevertheless, only about 15-17% of Australian family doctors self-reported having a special interest

in nutrition, while they considered a large range of other options as more important. This places family doctors in the midrange of medical specialities, well below groups such as gastroenterologists, paediatricians and public health physicians (Helman, 1997). Almost 90% of Australian family doctors viewed weight management as important and felt they had an important role to play. Although they considered themselves to be well prepared to treat overweight patients, they believed that they had limited efficacy in weight management and found it professionally unrewarding (Campbell et al., 2000). Forty-six percent of American physicians thought that discussing nutrition was highly relevant to their practices, 47% thought the same about discussing weight, and 21% stated that they had received extensive related training (Frank et al., 2002). A Dutch study aimed to develop a concise priority list of disease-related topics reflecting the needs of family doctors for nutrition communication geared to everyday practice. The top 5 of the most important nutrition-related topics in general practice were weight problems, diabetes mellitus, hypercholesterolaemia, intestinal complaints and hypertension (Maiburg et al., 2004).

Several studies revealed family doctors' *expectations regarding nutrition communication*. The perception of family doctors in twelve European countries was that the main source of information on healthy diet for the population is the media (Brotons et al., 2005). Most British family doctors (83%) rated their nutritional knowledge as average, but the majority of family doctors (76%) also believed their knowledge was fairly up-to-date (Moore & Adamson, 2002). In addition, two thirds of Australian family doctors believed they had the knowledge to provide nutrition counselling (Nicholas et al., 2005).

To conclude, family doctors' perceptions regarding nutrition communication through family doctors are favourable. They feel that nutrition communication is the task of the family doctor, especially in the case of tertiary prevention. In addition, most family doctors are interested in nutrition. Nevertheless, family doctors believe that their nutrition knowledge could be improved.

Family doctors' self-efficacy to provide nutrition information

Several studies that included family doctors' self-efficacy to provide nutrition information were found. A study among Dutch family doctors showed that self-efficacy in general (that is, the perception of their own ability to influence the lifestyle and eating habits of patients with health problems) was a major determinant of actual nutrition communication behaviour (Hiddink et al., 1997b/1997d). Self-efficacy in coronary heart disease (that is, the perception of their own ability to give dietary advice in the treatment and prevention of coronary heart disease) also played a major role (Hiddink et al., 1997d). Both self-efficacy variables were just as important as determinants in

cross-sectional and longitudinal studies (Hiddink et al., 1999). Yet, family doctors probably make insufficient use of the opportunities for nutrition communication in their consultations. Three-quarters of British family doctors were (very) prepared to counsel patients on nutrition issues, such as excess calories, but only one fifth of British family doctors reported that they felt (very) effective at helping patients change nutrition behaviour (McAvoy et al., 1999). The results of EUROPREV research, aimed at assessing family doctors' attitudes towards prevention, showed that 56% of family doctors believed that the implementation of preventive activities was difficult (Brotons et al., 2003). Only 21% of American family doctors experienced personal gratification in counselling about diet issues (Soltesz et al., 1995b). Sixty-five percent of South African family doctors indicated that counselling on nutrition would be effective. However, South African family doctors appeared to be more confident in their ability to provide counselling on smoking cessation (86%) than on nutrition counselling (57%) (Talip et al., 2003). The majority of British family doctors believed that they were occasionally successful in helping patients make changes to their diet, whilst only 15% felt that they were usually successful, and nobody believed that they were always successful (Moore & Adamson, 2002). Two thirds of Australian family doctors believed they had the confidence to provide nutrition counselling and that they had the skills to provide nutrition counselling. About 50% of family doctors said they have the experience necessary to provide nutrition counselling (Nicholas et al., 2005).

Several studies that included family doctors' self-efficacy to provide information specifically about weight were found. American family doctors did not find counselling patients on weight very satisfying (Soltesz et al., 1995b). Only one third of Scottish family doctors believed that they had been successful in treating overweight patients (Eley Morris et al., 1999). Israeli family doctors felt more prepared (65%) to advise on weight management than on other topics such as smoking cessation or coping with stress, but they did not report having the impression of having made any difference in the success at making long-lasting changes in lifestyle. However, most family doctors (72%) believed that they had limited efficacy in treating obesity and considered themselves not well prepared by medical school to treat overweight patients (Fogelman et al., 2002). In the EUROPREV study, a relatively high 58% were sceptical about helping patients achieve or maintain normal weight (Brotons et al., 2003). Nevertheless, a study about American family doctors' attitudes toward the treatment of obesity showed that 85% of family doctors agreed that they felt obligated to educate on health risk (Foster et al., 2003). Australian family doctors assigned higher priority to diabetes, lipid disorders and obesity than to hypertension, ischaemic heart disease and overweight

(Nicholas et al., 2005). Some studies investigated self-efficacy to use specific strategies and these were described below.

To conclude, family doctors are not very confident in their ability to provide nutrition information to patients. When it comes to weight, their self-efficacy seems to be even lower.

Family doctors' perceived barriers regarding nutrition communication

In addition, several researchers investigated the barriers perceived by family doctors with respect to nutrition communication. The most important barriers expressed by Dutch family doctors were not being trained in nutrition (65%), lack of time to address nutrition issues (47%), and the perception that patients lack motivation to change dietary patterns (43%) (Hiddink et al., 1995). Lack of nutrition training and lack of time to treat overweight were major determinants of family doctors' actual nutrition communication behaviour (Hiddink et al., 1997b). Secondary analysis also discovered lack of skills to treat overweight as a major determinant of actual nutrition communication behaviour (Hiddink et al., 1997d). In an American study, ranking of perceived barriers to delivery of dietary counselling were lack of time (75%), patient non-compliance (71%), inadequate teaching materials (69%), lack of counselling training (67%), lack of knowledge (62%), inadequate reimbursement (61%), and low physician confidence (50%) (Kushner, 1995). A survey of British family doctors believed apathy to be the greatest barrier to dietary change among the public (Buttriss, 1997). Most Danish family doctors perceived the patients' lack of motivation, insufficient time for each patient and inadequate nutrition knowledge as the most important barriers to proper nutrition counselling (Holund et al., 1997). American family doctors reported not having had adequate preparation for their role as promoters of good nutrition (Glanz, 1997). Similarly, lack of training was most notably a barrier to counselling about nutrition among Swiss family doctors (Cornuz et al., 2000). In a South-African study, lack of time was the barrier most frequently identified, followed by a lack of patient compliance. Family doctors also indicated that a lack of knowledge was a barrier regarding nutrition counselling (Talip et al., 2003). Some 60% of Israeli family doctors reported the feeling that they had insufficient knowledge regarding nutritional issues (Fogelman et al., 2002). Among the obstacles in individual-based nutrition communication, Croatian family doctors selected lack of time as the most important, followed by lack of incentives, lack of knowledge on nutrition, lack of knowledge on effective counselling and lack of family approach in nutrition consultation (Pavlekovic & Brborovic, 2005).

It can be concluded that family doctors perceive several barriers to providing nutrition information, including lack of time, lack of knowledge, lack of training, lack of skills and lack of patient compliance.

Family doctors' strategies regarding nutrition communication

Giving personal information to patients and asking the patient to make an appointment with the dietician were considered by Dutch family doctors to be highly effective and highly applicable. More than 90% of family doctors implemented these strategies for nutrition guidance. Publications available in the examination room had a good score in perceived effectiveness and applicability. Eighty percent of family doctors had publications about nutrition in their examination room (Hiddink et al., 1997c). American family doctors' confidence in their ability to motivate and guide patients who needed to change their diets was moderate. They were most confident about being able to provide specific nutrition information, followed by helping patients to set short-term dietary change goals, increasing patients' motivation, providing specific dietary changes and advising patients about maintenance of change (Glanz et al., 1995). An Australian study used the same arrangement. Australian family doctors rated their confidence for helping patients to set short-term goals and recommending specific dietary changes as the highest, followed by increasing patient motivation, providing specific nutrition information and giving specific maintenance advice (Richards & Mitchell, 2002). Eighty-five percent of Australian family doctors provided nutrition leaflets to their patients, with 59% stating they often discuss these with their patients. Other strategies were assessing the patients' diet and assessing the patients' readiness to change (Nicholas et al., 2005).

With respect to communication about overweight, the longitudinal study of Hiddink et al. (1999) revealed that communication about overweight has shown a significant decrease over the last five years, just as some of its major determinants, such as self-efficacy factors and some attitudes. In a survey about Israeli family doctors' attitudes regarding obesity, the medical advice most frequently offered was to increase physical activity, to decrease the number of total calories, and consultation with a dietician (95, 81 and 58%, respectively). Moreover, 62% of family doctors stated they distribute patient-information leaflets and 57% of family doctors reported that they tried to recruit patients' family members into the process. Relatively few (25%) advised group support meetings (Fogelman et al., 2002). Mercer et al. (2003) sought to draw lessons from the tobacco experience for the organisation of more successful obesity control. They recommended using the 5As: Assess, Advise, Agree, Assist, and Arrange follow-up.

To conclude, family doctors use a range of strategies regarding nutrition communication. This implies that there are many opportunities to provide nutrition information, but they require different levels of effort. Little effort is necessary to provide health education publications in the examination room. A lot of effort is required from family doctors to give specific maintenance advice to patients.

Conclusions with respect to family doctors' perspective

It can be concluded that family doctors' perceptions regarding nutrition communication are positive. The majority perceive nutrition communication as their task, especially in tertiary prevention. Most family doctors are also interested in nutrition. However, family doctors' self-efficacy to provide information about nutrition and weight is rather low.

Besides, family doctors perceive several barriers to providing nutrition information, including lack of time, lack of knowledge, lack of education, and patient non-compliance.

Moreover, family doctors' strategies regarding nutrition communication varied.

To conclude, family doctors' perspective on nutrition communication shows a mixed picture: although they have favourable attitudes towards nutrition communication to their patients, they perceive several barriers to providing nutrition information.

GENERAL CONCLUSIONS ABOUT NUTRITION COMMUNICATION IN GENERAL PRACTICE

In this review, we provided an overview of nutrition communication in general practice, taking into account the perspective of both patients and family doctors. In this field, we found several publications that were based on observations and self-reports. Standardised observations reduced recall bias and increased data objectivity. On the other hand, observations were appropriate to assess frequencies and duration of nutrition communication. Self-reports were possibly influenced by social desirability. However, with respect to psycho-social variables, one could only rely on self-reported data. Comparisons were hard to make, because of differences in measurement methods and differences between countries. The highest percentages were found for family doctors' actual nutrition communication behaviour in the United States. This might be explained by patient factors, such as a higher prevalence of nutrition-related diseases, but also by factors inherent in the health care system, such as the vocational training program.

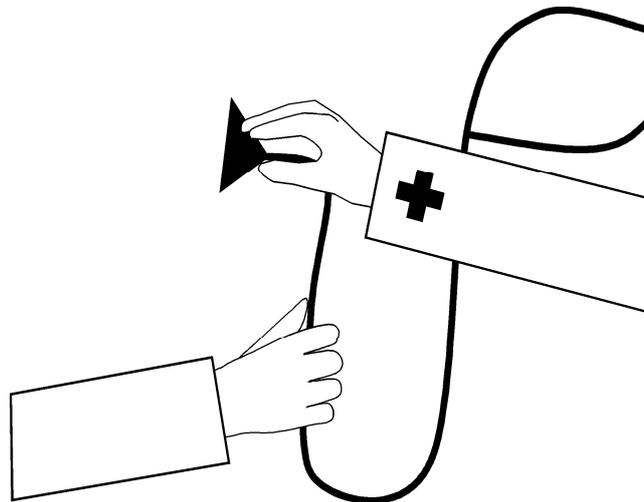
Nutrition is a daily topic in general practice. With respect to the patients' perspective, patients are generally positive about nutrition communication through their family doctors. The family

doctors' perspective shows a more mixed picture. Although family doctors hold favourable attitudes towards nutrition communication to their patients, they perceive several barriers to nutrition communication in general practice.

Whether this situation also holds in Dutch general practice will be studied in our empirical studies with Dutch patients (Chapter 3, 4 and 5) and family doctors (Chapter 6 and 7). These results will be compared in Chapter 8 with the results of the studies performed by Hiddink et al. (1995/1997a/1997b/1997c/1997d/1999) and the results of recent studies presented at the Fourth Heelsum International Workshop (Truswell, 2005).

CHAPTER 3

UNDERSTANDING NUTRITION COMMUNICATION BETWEEN HEALTH PROFESSIONALS AND CONSUMERS: DEVELOPMENT OF A MODEL FOR NUTRITION AWARENESS BASED ON QUALITATIVE CONSUMER RESEARCH



Published as:

Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Understanding nutrition communication between health professionals and consumers: development of a model for nutrition awareness based on qualitative consumer research. *Am J Clin Nutr* 2003; 77: 1065S-1072S.

ABSTRACT

Background: Consumers have been exposed to nutrition information from a variety of sources, including the family doctor. Furthermore, they were not aware of their own risk behaviour regarding nutrition.

Objective: This study sought to assess food associations, conversation topics, interest in food topics, and use of information sources by means of qualitative consumer research. Another aim was to provide a hypothetical model for nutrition awareness that could be tested in a quantitative survey.

Design: Three focus groups with 30 Dutch consumers altogether were carried out. Qualitative data were analysed with the computer software program NUD*IST (QSR, Melbourne, Australia) by sorting text blocks into categories and new themes emerged. In addition, a hypothetical model for nutrition awareness was developed.

Results: Consumers associated food most often with safe food and interest in food safety was most often discussed. Tasty food was the most important food conversation topic. The family doctor was the information source most talked about. Furthermore, they possibly lacked some nutrition awareness.

Conclusions: Careful analysis revealed new themes (new in the past 10 y), such as concerns about food safety and reconsideration of the roles of family doctors and dieticians. Based on these themes, recommendations for nutrition communication were composed.

Key words: Consumers, family doctors, nutrition communication, the Netherlands, focus groups, NUD*IST, nutrition awareness, interaction between family doctors and consumers, beliefs about food, conversation topics, interest in food topics, information sources

Acknowledgements: We thank the market research office GfK (Lianne van der Wijst, Kamieke van de Riet for their collaboration in this research; and moderator Ieteke Hasselo and assistant moderator Willie van Varik for guiding the focus groups). We also thank the Nutrition Center (Boudewijn Breedveld) for comments on the checklist. Finally, we thank the participants.

INTRODUCTION

Today the relationship between nutrition and health has been firmly established (Willett, 1994; US Preventive Services Task Force, 1998; WHO, 2000; USDHHS, 2000; USDA/USDHHS, 2000; National Heart, Lung, and Blood Institute, 1998). This evidence is translated into the dietary guidelines produced by the Health Council of the Netherlands in 1986 (first version; some revisions have been published)(Nutrition Council of the Netherlands, 1986; Health Council of the Netherlands, 2000/2001). During the past few decades, nutrition education has been developing (Contento et al., 1995). Health professionals provide nutrition education; however, the interaction between health professional and consumer is not optimal (Hiddink et al., 1995; Van den Hogen et al., 1996; Van Binsbergen & Ocké, 2001). In addition, the supply of nutrition information in the media has increased. Recently, new information sources have developed, such as web-sites, that provide information on demand (Van Woerkum, 2003). As a result, consumers have been exposed to nutrition information from a variety of sources. New questions arise, and family doctors are often called upon to answer them (Van Woerkum, 1999).

Answering these questions is not always easy for family doctors, because eating behaviour is the result of a complex interaction of biological, economic, sociological and psychological factors (Shepherd, 1985; Rozin & Vollmecke, 1986; De Graaf & Stafleu, 1992, Contento et al., 1995; Van Assema et al., 1990/2001). One problem is that most consumers believe they eat healthily; however, the Third National Food Consumption Survey shows that many do not (Nutrition Center, 1998). Little research has been done on this lack of awareness (Brug, 1994; Lechner et al., 1997; Van Assema et al., 2001). Awareness is an important concept in the Stages of Change Model (Prochaska & DiClemente, 1992) and the Precaution Adoption Process Model (Weinstein, 1988). The first model describes stages through which people may progress toward long term health behaviours: (1) precontemplation (not yet considering change); (2) contemplation (considering change); (3) preparation (planning change); (4) action (actively change); and (5) maintenance (sustaining change). Application of Stages of Change to nutrition is reported by Lechner et al. (1997). The Precaution Adoption Process Model distinguishes three levels: (1) awareness of risk behaviour (e.g. they know that too much fat food is unhealthy); (2) awareness of other people's performing risk behaviour (e.g. they know that people eat too much fat in general); and (3) awareness of their own risk behaviour (e.g. they know that they eat too much fat). Only after reaching this third level will people be motivated to change. Therefore, determinants of nutrition awareness should be studied.

A goal of many nutrition education programs is to raise awareness as the first step in behavioural change (Contento et al., 1995; Van Assema et al., 2001). Information sources can influence awareness positively. Previous consumer research mentioned television, radio, magazines, newspapers, health professionals, and food labels as information sources (Kunkel et al., 1986; Worsley, 1989; Probart et al., 1989; Medeiros et al., 1991; De Almeida et al., 1997). Hiddink et al. (1997a) carried out an extended Dutch survey 10 y ago, with the family doctor, the dietician and the Netherlands Nutrition Center (an independent institute that takes part in the public debate on food and nutrition; their products and services are aimed on consumers, physicians, dieticians, and teachers) as preferred sources.

At the moment there are new food topics being discussed, such as food safety, genetic modification of food, and functional foods. Also, thoughts about effective nutrition education have evolved (Contento et al., 1995; Truswell, 1997/1999). For these reasons, we judged it necessary to add to the study of Hiddink et al. (1997a). However, there is little information available on pre-existing knowledge, attitudes, and beliefs about food, so first a qualitative research phase was carried out. This article describes the results of qualitative consumer research. Moreover, the aim is to provide a hypothetical model for nutrition awareness that can be tested in the quantitative survey.

METHODS

Focus groups

A focus group is a group with a minimum of seven and a maximum of twelve subjects discussing their thoughts on a specific issue (Krueger, 1988). In recent years, focus groups have become the most popular qualitative method used in social and behavioural sciences (Green & Kreuter, 1999). We decided to use focus groups for exploration of motivations, generation of hypotheses, and ideas about new theoretical concepts. Later on, we would use it for interpreting the results of our quantitative study (Basch, 1987; Krueger, 1988; Van Assema, 1992a; Morgan, 1993; Kitzinger, 1995). Focus groups have been widely used in health promotion and nutrition research (Krueger, 1988; Van Assema, 1992b; Baranowski et al., 1993; Chapman & Maclean, 1993; Iszler et al., 1995), combined with other qualitative and quantitative methods (Krueger, 1988; Chapman & Maclean, 1993; Kitzinger, 1995). We used focus groups, qualitative in-depth interviews, and a quantitative survey.

Subjects

Our target group consisted of Dutch adults aged 18-80 y. The Dutch market research office GfK took a sample from the ScriptPanel, which is representative of the Dutch population. Three focus groups were composed based on age (n=30): (1) 18-30 y (youngsters), (2) 31-50 y (middle-aged), and (3) 51-80 y (elderly). We decided to group participants by age because of differences in eating patterns, information demands, and communication-related habit at different ages. Each group consisted of men and women, because we wanted to evoke a broader discussion.

Procedure

In the first half of 2001, three focus groups were carried out. After sampling, the recruiters contacted the respondents by telephone, mentioning that the discussion topic was nutrition communication. Focus groups were planned in the evening and lasted for 2.5 h. Discussions were videotaped, and simultaneous observation was possible. After an introduction, a moderator started the interview with the aid of a checklist, which was based on various questionnaires and was funnel-shaped. It contained questions about food in general, nutrition and health, information sources, food topics, nutrition knowledge, and nutrition education (including the role of the family doctor). In the middle of each session, the moderator offered each respondent 30 cards with food topics and asked each respondent to pick five cards out and sort them with regard to importance. Chosen cards were counted and results were discussed. When the discussions were finished, participants were asked to fill in a written questionnaire about information sources and food topics. Finally, each participant received a gift coupon.

Analysis

Initially, the authors stated hypotheses, and transcripts of the focus groups were made. Relatively few researchers use software designed for qualitative analysis (Richards & Richards, 1998). QSR NUD*IST is the leading computer package for qualitative analysis (Richards, 1998). QSR stands for Qualitative Solutions and Research, an Australian software development company. NUD*IST stands for Non-numerical Unstructured Data Indexing, Searching and Theorising. It is an Index-based approach, which means that codes are kept in an index system to explore ideas and create concepts (Richards, 1998). Data were analysed by the first author, using version 4 (QSR, 2002). Before analysis, a coding framework was constructed based on the research aims and interview schedule.

Hypothetical model

Figure 3.1 shows our hypothetical model of nutrition awareness. Three environmental variables were included: commercial sources, neutral sources, and social sources (**Table 3.1**). Next, eight individual variables were part of the model. Also, socio-demographic variables were included: sex, age, education level, income, life cycle, and residence (GfK, 2000).

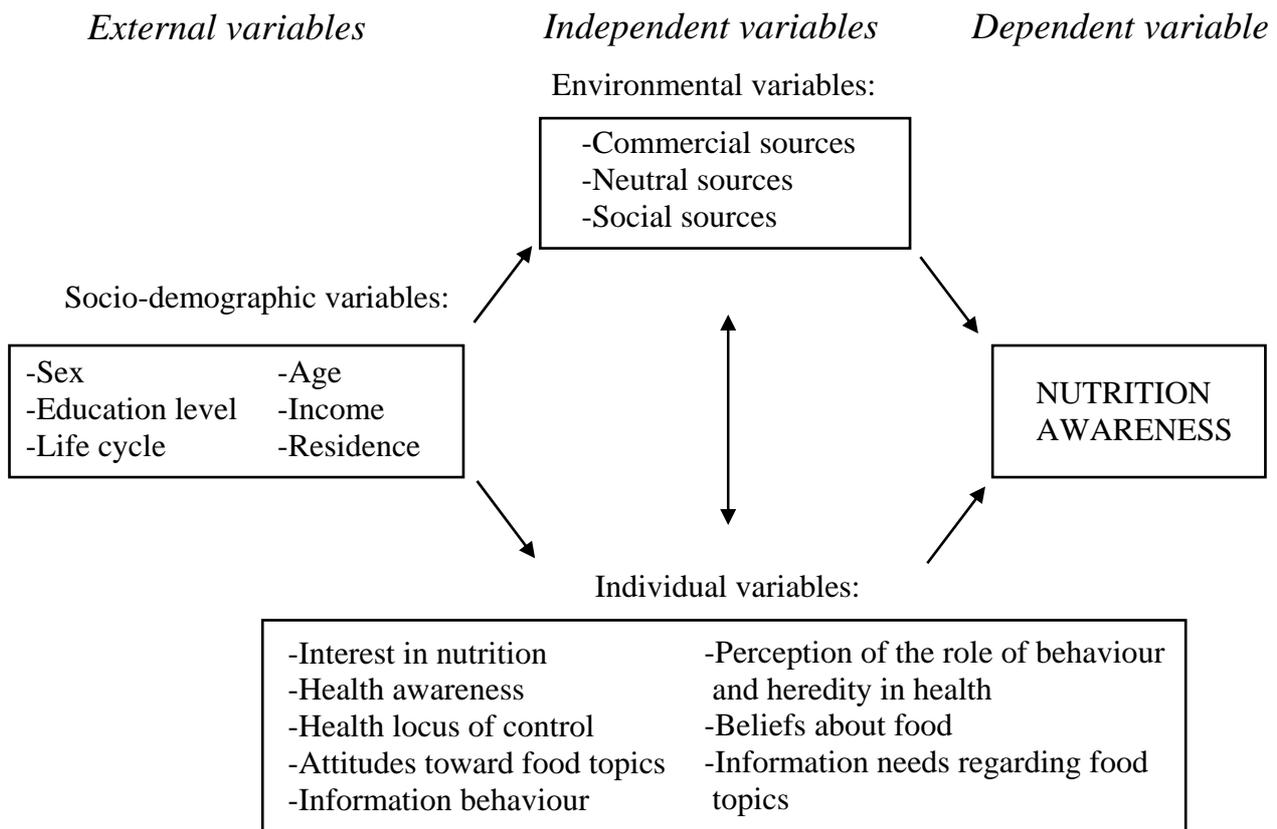


Figure 3.1 Hypothetical model for nutrition awareness

Table 3.1 Variables included in the model for nutrition awareness

Variables	Definitions
Nutrition awareness	Realisation of one's own personal risk behaviour regarding nutrition (Weinstein, 1988)
Commercial sources	Information sources, like media, commercials, advertisements, displays, and, shop personnel (Kunkel et al., 1986; Worsley, 1989; Medeiros et al., 1991; De Almeida et al., 1997; Buttriss, 1997; Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999; Falk et al., 2001)
Neutral sources	Information sources, such as family doctors, dieticians, Consumer Alliances, national education organisations, and government (Kunkel et al., 1986; Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999; Falk et al., 2001)
Social sources	Information sources in the social environment, such as partner, family, friends, relatives, neighbours, and colleagues (Kunkel et al., 1986; Worsley, 1989; Probart et al., 1989; De Almeida et al., 1997; Falk et al., 2001)
Interest in nutrition	Involvement of the consumer with the topic of nutrition (Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999)
Perception of the role of behaviour and heredity in health	Consumer's estimation of the contribution of behavioural factors (diet, smoking, alcohol, stress, physical activity, personal hygiene) and the non-behavioural factor heredity on the consumer's health state (Hiddink et al., 1997a)
Health awareness	Interest in health, which is reflected in choosing healthy food products, and interest in physical activity (Van Gaasbeek & Hansman, 2000)
Health locus of control (HLC)	Individuals' beliefs in their own ability to control health (internal HLC), extent to which health is controlled by health professionals (powerful others HLC), and extent to which health is determined by chance or fate (chance HLC) (Norman & Bennett, 1996)
Beliefs about food	Meanings attached to food in daily living (IEFS, 1996; SWOKA, 1999; Falk et al., 2001)
Attitudes towards food topics	Opinion about certain food topics (SWOKA, 1999; Worsley & Worsley, 1991)
Information needs regarding food topics	Consumer's needs of specific knowledge to obtain answers to important questions (Hiddink et al., 1997a)
Information behaviour	The way the consumer obtains information (in a passive way, one can obtain information by normal media use; a more active form is also possible, namely actively seeking for information (GfK, 1999)

RESULTS

Below, the results of the focus groups will be discussed. For each category, the first ten subcategories will be represented. Next, the first five subcategories will be illustrated. We will finish with some remarks about lack of awareness.

Food associations

The first ten associations, in decreasing order, were (1) safe food, (2) preparing meals, (3) healthy food, (4) tasty food, (5) eating less fat, (6) unhealthy food, (7) price of products, (8) vegetables, (9) balanced food, and (10) shopping.

The most important association was safe food, and different perspectives were voiced. First, it was associated with food scares: "In general, news about nutrition is negative. When they talk about nutrition, it is always about trouble. *Salmonella*, dioxins, and BSE [bovine spongiform encephalopathy] are the news topics." Other associations were food hygiene, use of pesticides and insecticides on plants, genetic modification of food, and food additives. The elderly talked most often about safe food by expressing their concerns about safe food.

Preparing meals was associated with time spent on cooking: "Very quick and easy. Let's say, quick cooking. A lot of salads or raw food, if it doesn't take much time, because I don't like that." Furthermore, consumers thought about saving meals, actual cooking time, warming up meals, danger of *Salmonella*, cooking for groups, and recipes. The focus groups showed that youngsters were most often concerned about preparing meals.

When talking about healthy food, consumers mentioned the relationship between nutrition and disease: "When you notice that people in your environment become ill, you begin to pay attention to nutrition." They also cited vitamin supplements, life cycle (living situation: if someone lives independently or lives together, and if someone has children or not), and sex (ie, that healthy eating associated more with women than with men). Youngsters in particular talked about the relationship between nutrition and disease more than any other group talked about this topic.

Next, many consumers discussed the idea of tasty food. They wondered if healthy food could also be tasty food: "I know deep inside that it is not so healthy and that I should eat less. But it is very difficult, because those products are just the tasty things." When thinking about tasty food, they thought about food preferences, homegrown fresh food, and sociability. Especially the elderly had the association of tasty food.

Finally, consumers coupled eating less fat with many different efforts, such as eating fewer French fries, use of baked and fried products (eg. those with olive oil), consuming low-fat dairy products, and eating lean meat or fish. They also associated it with efforts to lose weight. The group aged between 31 and 50 years old often mentioned eating less fat.

Conversation topics

Consumers loved to talk about tasty food. Conversation topics, in decreasing order, were (1) tasty food, (2) healthy food, (3) recipes, (4) consequences of BSE and foot and mouth disease (FMD), (5) regular eating, (6) diet, (7) price of foods, (8) balanced food, (9) the question "What will we eat tonight?" and (10) nutrition of children.

When consumers talked about tasty food with others in their social environment, the conversation was about recipes, new products, and going out for dinner. "If you're going out for dinner, we ate there the other day and it was delicious." Especially the consumers between 31 and 50 talked about this with friends and colleagues.

Healthy food was also a conversation topic. They often spoke about fruits and vegetables. "Who eats fruit and who doesn't, what fruit sorts are there and whether eating more fruit actually would help you feel healthier, because there are a lot of people who don't believe that it would." They also discussed eating habits, eating less fat, losing weight, and the relationship between nutrition and health. Conversation partners were mainly family members.

Consumers also mentioned recipes as a conversation topic. They talked about this with friends and colleagues. "If I made something delicious, they asked: what have you made, what is in it, how do you make that, and how long does it take?"

Youngsters especially discussed consequences of BSE and FMD with their friends. "I try to convince people to become vegetarian, but I must say I am not successful, although mentioning BSE helps."

Some consumers, especially the elderly, talked about regularly eating with others, especially the elderly. They spoke about breakfast, what time meals are eaten, and snacks: "My mother often scolds me for the in-betweens. I think she really is right."

Interest in food topics

Respondents were interested in decreasing order in the following food topics: (1) food safety, (2) fruits and vegetables, (3) genetic modification of food, (4) vitamins, (5) composition of food products, (6) preparing and saving food, (7) food supplements, (8) eating less fat, (9) European E-

numbers (Additives, both natural and artificially produced, are only allowed after a series of studies that show they produce no indicative health risk. After allowance in the European Union they get an E-number.), and (10) functional foods.

Food safety was the topic most often discussed. They thought about food scares, food hygiene, use of pesticides and insecticides on plants, and food additives: "When my children or grandchildren visit me, I always look at whether something, like an ice cream, contains too much artificial colouring." They mentioned food safety as an important topic, and they were interested in some aspects in particular: Do we eat products that are safe? How do we know if an egg is a free-range egg other than from the mark? What is going on with the use of pesticides and insecticides on plants? The following information sources were mentioned: newspapers, magazines, the Internet, the Netherlands Nutrition Center, the research institute TNO Nutrition, the Food Inspection Department and Health Inspection Department.

Next, fruits and vegetables were an important food topic. Discussion points were the slogan ('Eat 200 g of vegetables and two pieces of fruit per day. '), vitamins, the health value of fruits and vegetables, actual fruit and vegetables consumption, vegetables in combination with potatoes and meat, freshness, taste, and biological fruits and vegetables. "That information is mostly transmitted via radio and TV. It is written in all the newspapers. I think that when you are old, you still know that slogan."

Many consumers expressed dislike for genetic modification of food, another food topic. "And I think, why do they mess with that, why could they leave those soy beans as they are?" Especially the elderly talked about it. They were interested in information about the consequences of genetic modification for plants and humans. They mentioned the following information sources: universities, research institutes, Consumer Alliance, food labels, and World Wildlife Fund.

Consumers believed that vitamins were an important food topic. The first thought was that they are necessary. "Every winter a lot of people catch a cold and get the flu, but don't become ill, because they take extra vitamins." Other discussion topics were products that contain vitamins, vitamin supplements, products enriched with vitamins (functional foods), and what happens to vitamins during cooking.

Also, composition of food products was mentioned. Consumers talked about additives, food allergies, food labels, and food lists. Particularly the elderly spoke about this. They said they wanted more information on the following aspects: What do the European E-numbers mean? How do we know if a product contains additives?; How much energy does a portion of a product contain? Information sources mentioned were food labels, the Netherlands Nutrition Center, Postbus 51

(information channel from the Dutch government), food manufacturers, supermarket magazines (eg. Allerhande), and food lists from the European Union.

Information sources

Consumers mentioned in decreasing order the following nutrition information sources: (1) family doctor, (2) social environment, (3) magazines, (4) Internet, (5) dietician, (6) television, (7) the Netherlands Nutrition Center, (8) food labels, (9) the media, and (10) food manufacturers.

The family doctor was the information source that was most talked about. Especially the elderly talked about the family doctor. They said they went to the doctor when ill. "The doctor gives advice only when something is the matter." In the viewpoint of the consumers the family doctor was the one who diagnosed, advised, and eventually referred to another specialist, such as the dietician. They found the family doctor suitable as nutrition information source in the following circumstances: disease in general, lowering cholesterol, eating less fat, eating less salt, diet, food allergies, and drugs. "Nutrition affects your organs and the wellness of your body, so the family doctor is the best person to consult about nutrition."

Another important nutrition information source was the social environment. Many consumers got nutrition information from their own partner. In addition, their own parents, friends, children and relatives, acted as information sources. "My mother tells me that I should eat healthy, and now I realise that a little bit." Social environment was especially important for the youngsters.

Magazines were often used as an information source. Magazines mentioned were supermarket magazines (eg, Allerhande), magazines for women (eg, Libelle, Margriet), magazines for parents (eg, Ouders van nu, Moeders), magazines for consumers (eg, Consumentengids, Kritisch Consumeren), and culinary magazines (eg, Sla, Lekker en gezond). "Look at the magazines: there is a lot written about diets. Women should always be thin and losing weight."

The Internet was seen as an important information source. "When something happens in your social environment, you will search on the Internet to get more information about the topic." Websites such as Health Index, Health Center, Web Doctor, the Netherlands Nutrition Center, and Senior Web were mentioned. The Internet was most popular among the youngsters.

Finally, the dietician was considered an information source, especially by the elderly. "I think a doctor knows more than us, but he is very general. If you really want to know something about nutrition, you should go to a dietician." They found the dietician a suitable source for topics such as diet, losing weight, and over- and underweight problems.

Lack of nutrition awareness

Another conclusion from the focus groups was that consumers believed they eat healthily. In this study we could not get a picture of their actual eating behaviour. It was very possible, that they lacked nutrition awareness. Therefore, a hypothetical model for nutrition awareness was developed as described above (Figure 3.1). On the basis of the qualitative research and literature, 17 factors were selected with a high probability of predicting nutrition awareness. Another eight factors were also measured in the quantitative questionnaire but were excluded from the hypothetical model.

DISCUSSION

This article describes the results of qualitative consumer research. For discussion, we have selected the following themes.

Concerns about food safety

Food safety was the topic most often discussed. Concerns about food safety were also found in other Dutch studies (Berenschot, 1999; SWOKA, 1999; Committee on biotechnology and food, 2002). Consumers found safety the most important out of several social aspects, including healthiness of a product, freshness, environmental-friendliness, animal welfare, and third world effects (SWOKA, 1999). They were concerned about food hygiene, hormones in meat, and BSE. The Berenschot study (1999) showed that 25% never worried about food safety. A recent study showed that more than 60% of the Dutch population was worried about biotechnology, particularly genetically modified products (Committee on biotechnology and food, 2002).

Concerns about food safety can be explained by the fact that the physical and psychological distance between producers and consumers is still growing. In recent years food technology has rapidly developed, and consumers have little idea about how food is produced. These factors have led to a process of alienation (Hermus, 2001). Many consumers believe they have no control over food safety (Committee on biotechnology and food, 2002). Recent food scares have worsened this, because in panic they have drawn wrong conclusions. At this moment, food is in fact safer than ever before (Hermus, 2001).

Tasty versus healthy food versus safe food

Respondents viewed tasty and healthy food as two different and mutually exclusive things. In the Western European way of thinking, 'healthy' is associated with reasonable thought, and 'tasty' with

emotion. Rozin et al. (1999) noticed cultural differences in concerns for healthiness and obtaining pleasure from eating. Food could also be dichotomised in healthy food and junk food. Junk food was associated with pleasure (Chapman & Maclean, 1993). According to Falk et al. (2001) many people associated eating with good health. Another study showed that consumers' first association was pleasure (IEFS, 1996). Food choices were often guided by how foods taste. Nutrition education ought to consider pleasure as well as safety.

Furthermore, consumers noticed that healthy and safe were different concepts. In their perception, safe food had to do with the short term, whereas healthy food was associated with the long term. Generally, people are more sensitive to short-term than to long-term considerations (Raaijmakers & Vaandrager, 2000). Therefore, we decided to develop three hypothetical models: nutrition awareness (Figure 3.1), tasty food awareness, and food safety awareness. The last two models will be described later.

Concerns about weight

Many women believed that a slim figure is achieved by eating healthy food and avoiding junk food (Chapman & Maclean, 1993). In our study, respondents hardly mentioned weight. In general terms, the youngsters discussed losing weight and the slenderness ideal. One respondent admitted being too heavy, but the others did not. Some were, in fact, overweight, as about 40% of Dutch people are (Visscher & Seidell, 2001).

In contrast, during the in-depth interviews showed a lot of people complained about their weight. They said they paid attention to their weight and admitted being too heavy. They expressed a need for more information about (losing) weight and mentioned the dietician and family doctor as information sources. So weight seems to be a sensitive topic that is hard to get at in a focus group. Participants felt more comfortable to speak about it in in-depth interviews, when only the interviewer was present.

Information overload regarding fruit and vegetables

Despite interest in fruits and vegetables, respondents did not need more information, because they already knew. Responses to the question 'What dietary guidelines do you know?' indicated high knowledge (eg, 'Eat 200 g of vegetables and two pieces of fruit per day'). General principles are taught in schools and communicated by the Netherlands Nutrition Center. In this way communication flowed via the central route of the Elaboration Likelihood Model, so there is a high tendency to think about information more thoroughly (Petty & Cacioppo, 1986). The other way of

information processing goes along the peripheral route, which involves cues such as information source of the message, form of the message, and the behaviour of others (Schaalma et al., 2001).

Furthermore, repetition was involved. The messages have worked because they convince and remind. However, reactions to messages turn sour if messages are presented too often (overexposure effect) (Zimbardo & Leippe, 1991). Consumers experienced information overload owing to repetition. Providing some novelty in the repeated messages keeps things interesting.

Concerns about preparing and saving meals

Youngsters were concerned about preparing and saving meals. This can be explained by the convenience culture. Consumers are living in the 24-h society: they always have to hurry and do their shopping and cooking in a rush. Of course, food producers noticed this and developed convenience products (Korver, 2001). Youngsters never learned to spend a lot of time on cooking and about alternatives, so they have become used to convenience food.

Information needs of elderly

The elderly were probably more receptive to new information. In accordance with a recent study (Committee on biotechnology and food, 2002), they expressed a need for information about genetic modification of food. They said they wanted information about new topics such as food safety, composition of food products, food supplements, and functional foods. Information needs of elderly were important and should be acted upon, because the number of people over 50 in the Dutch population is rapidly growing (Hermus, 2001) and making increasing demands on the health care system.

Roles of family doctors and dieticians

Family doctors and dieticians were considered complementary: the family doctor indicated, advised, and eventually referred to the dietician. Despite the fact that only a few consumers had experience with a dietician, they perceived dieticians as being more reliable and more knowledgeable about nutrition. Family doctors and dieticians are in a position to provide effective nutrition interaction (Nicholas et al., 2003). According to Fuller et al. (2003), people believe that family doctors play a role in nutrition communication when patients have something wrong with them. Good referrals were also deemed necessary when health themes were involved.

Determinants of nutrition awareness

Little research has been done on the determinants of nutrition awareness. Women and more educated consumers were usually more nutrition aware (Girois et al., 2001). The Pan-EU survey (IEFS, 1996) concluded that youngsters (<35 y) were more aware of diet because of lifestyle and outlook on health. A thorough analysis of the determinants of nutrition awareness is necessary. Therefore, we have developed a hypothetical model for nutrition awareness, to be tested in the quantitative study.

Limitations and implications

The topics health and family doctors got extra attention in the discussion. It could be that the results were exaggerated. If so, the quantitative study will clarify these points.

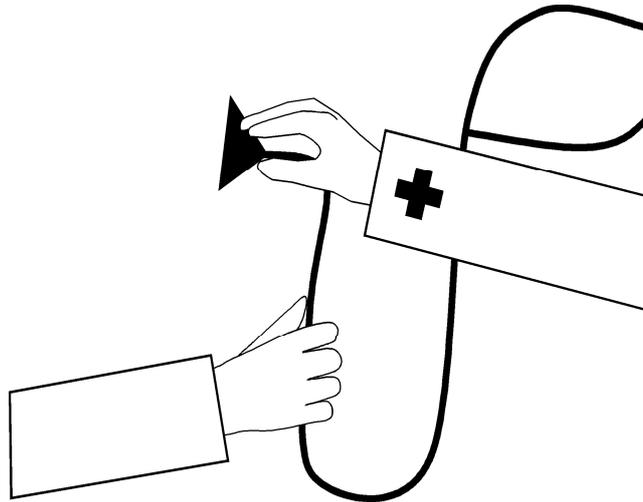
Based on the themes, recommendations for nutrition communication were established (**Table 3.2**). The results of this study served as a basis for the development of the quantitative questionnaire. The hypothetical model for nutrition awareness will probably be useful for target group segmentation. Finally, family doctors and other health professionals could benefit from understanding how consumers think, talk about, and act with regard to nutrition, and in turn this could enhance the effectiveness of their nutrition interactions.

Table 3.2 Recommendations for nutrition communication

- Give transparent information about food safety: make clear which food chains are involved in production. The recently established Dutch Food Authority could narrow the gap between consumers and producers (Committee on biotechnology and food, 2002). The Netherlands Nutrition Center could provide information to consumers. In case of a food scare, they will be more able to cope with it.
 - Discuss weight: overweight is a social problem and should be a discussion topic among scientists and members of the general public. The emphasis should not be on losing weight, but balanced food and getting enough physical activity. Family doctors and dieticians are considered as suitable information sources.
 - Disseminate a new message: healthy eating can also mean tasty eating. This is something the family doctor should take into account.
 - Try the peripheral route for communication about fruit and vegetables: the central route probably does not work anymore because of information overload. The focus should be on peripheral cues: clear statement of a reliable and expert information source, an attractive message form that is new and different, and attractive role models who show the best behaviour to adopt.
 - Educate youngsters about preparing and saving meals: raise awareness and increase their knowledge, attitudes, self-efficacy, and skills. School probably provides a good setting (eg, biology lessons, care lessons, techniques lessons).
 - Fulfil the information needs of the elderly: provide information about new food topics. The family doctor should consider the needs of the elderly, because they frequently go to the doctor.
 - Strengthen co-operation between family doctors and dieticians: both groups of health professionals should work together, because they could benefit from each other and play complementary roles.
-

CHAPTER 4

PERCEIVED RELEVANCE AND INFORMATION NEEDS REGARDING FOOD TOPICS AND PREFERRED INFORMATION SOURCES AMONG DUTCH ADULTS: RESULTS OF A QUANTITATIVE CONSUMER STUDY



Published as:

Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Perceived relevance and information needs regarding food topics and preferred information sources among Dutch adults: results of a quantitative consumer study. *Eur J Clin Nutr* 2004; 58: 1306-1313.

ABSTRACT

Objective: For more effective nutrition communication it is crucial to identify sources from which consumers seek information. Our purpose was to assess perceived relevance and information needs regarding food topics, and preferred information sources by means of quantitative consumer research.

Design: Based on qualitative studies, a quantitative questionnaire was developed and administered in face-to-face interviews.

Subjects: The study population consisted of Dutch adults aged 18-80 y. A stratified sample of 923 adults was taken from the GfK ScriptPanel; 603 respondents completed the questionnaire.

Results: Despite high perceived relevance of food topics regarding dietary guidelines (55-78%), most respondents indicated that they did not want more information about these topics (71-74%). Furthermore, our study revealed information needs regarding safety- and health-related food topics (up to 77% in some subgroups). Differences in perceived relevance and information needs were found in subgroups based on gender, age, perceived weight and socio-economic status. Education offices of the food sector and the family doctor were mentioned for most food topics, who ranked among the highest regarding perceived reliability, perceived expertise, clearness and accessibility.

Conclusions: With respect to five food topics (losing weight, sports and nutrition, lowering cholesterol, carbohydrates, and food composition), interested subgroups should receive tailored information. For other groups and food topics, a population-wide strategy should suffice, utilising the preferred information source. If people who are not yet interested become interested through a life event, information on demand can be put into action.

Sponsorship: Dutch Dairy Association.

Keywords: nutrition communication; food topics; information needs; information sources; health professionals; media.

Acknowledgements: We thank the market research office GfK (Lianne van der Wijst and Kamieke van de Riet) for their collaboration in this research. Finally, we thank the participants.

INTRODUCTION

The growing body of scientific evidence of a relationship between nutrition and chronic disease has led to dietary recommendations which are built into nutrition communication (USDA/USDHHS, 2000; Nutrition Council of the Netherlands; 1986). Nutrition experts can channel strategies for nutrition communication if they understand what sources of information consumers prefer (Holgado et al., 2000). Consumers use different information sources depending on the kind of information they are seeking (Raab et al., 1989). Mass media and intermediaries, such as health professionals and teachers, provide nutrition communication (Contento et al., 2002). Next to normal media use, consumers scan mass media for relevant information, but detailed explanations are probably better given by health professionals (Worsley, 1989). Mass media are agenda-setting in that consumers tend to discuss what is said in mass media (Vaandrager & Koelen, 1997).

In the traditional communication model consumers are viewed as passive 'receivers'. However, consumers act more and more as initiators of the communication process by actively seeking for messages (Vaandrager & Koelen, 1997; Van Woerkum, 1999). Underlying this process is an information need, as the result of a perceived problem and translated into a question when problem solution is in reach (Te Molder, 1999). Often a set of circumstances trigger an information need, but also the media and other information sources play a role here. However, the messages must be seen and heard, attract attention and be correctly interpreted (Holgado et al., 2000).

To our knowledge, few studies have assessed the main sources of nutrition information in a comprehensive way. These studies found that mass media and health professionals are important sources (Kunkel et al., 1986; Cass Ryan & Gates, 1988; Worsley, 1989; Probart et al., 1989; Medeiros et al., 1991; Silvester & Horwath, 1991; De Almeida et al., 1997; Buttriss, 1997; Holgado et al., 2000). In the Netherlands, only one study has been conducted, which showed that many consumers use the family doctor as their first nutrition information source, followed by a dietician and the Netherlands Nutrition Center (Hiddink et al., 1997a). Some studies have focused on specific source characteristics like perceived reliability and perceived expertise (Kunkel et al., 1986; Worsley, 1989; Silvester & Horwath, 1991; De Almeida et al., 1997; Hiddink et al., 1997a). Additional characteristics, such as clearness of the message and accessibility of the message, have hardly been studied.

For five reasons, we judged it necessary to conduct a quantitative survey among Dutch consumers. Most studies have been conducted in other countries and the only Dutch study is almost 10 y old. In the meantime, ideas about effective nutrition communication have changed (Contento et

al., 1995/2002; Goldberg, 2000; Truswell, 1997/1999). The supply of nutrition information in mass media has increased and new information sources have been developed with the emphasis on information on demand, such as telephone information services and web-sites (Goldberg, 2000; Van Woerkum, 1999/2003). Furthermore, concerns about food topics like food safety, genetically modified foods, vitamin supplements and functional foods have become apparent (Clayton, 2000; Miles & Frewer, 2001; Coulson, 2002). We also believed that the role of relevant others in people's direct environment have been underestimated in previous studies. In this article, the following research questions will be answered:

- What food topics are important for Dutch consumers?
- Is there a need for information on these topics?
- What information sources do consumers prefer for information about these topics?
- What is the best source for information about nutrition and health when criteria like perceived reliability, perceived expertise, clearness of the message and accessibility of the message are taken into account?

STATISTICAL METHODS

Questionnaire

Qualitative studies were carried out in the first half of 2001, by means of focus group interviews and in-depth interviews to learn about the consumer's perspective (Van Dillen et al, 2003). Based on these results, a hypothetical model for nutrition awareness was developed to be tested in a quantitative study; this model will be described elsewhere (Van Dillen et al., 2005a). In addition, a questionnaire was developed, based on the qualitative results. In the second half of 2001, a quantitative survey was conducted among Dutch consumers who completed a face-to-face interview-assisted questionnaire. The questionnaire contained questions about perceived relevance of food topics, information needs, information sources, nutrition interest, nutrition knowledge, nutrition awareness, nutrition behaviour, nutrition communication, and expectations regarding nutrition communication through family doctors. In some units of the questionnaire the interviewer made use of cards.

Perceived relevance of food topics were assessed in the following way. Each participant was provided with a list of 18 food topics (balanced diet, carbohydrates, eating less fat, European E-numbers, food allergy, food composition, food hygiene, food safety, fruits and vegetables, functional foods, genetically modified foods, losing weight, lowering cholesterol, minerals,

nutrition and drugs, preparing and storing meals, sports and nutrition, vitamins) and asked to pick out five cards which were personally relevant and range them in order of importance.

In addition, respondents were asked if they needed more information about the five food topics identified as important. *Information needs regarding food topics (urgency)* were assessed by five questions, consisting of yes-no categories.

Preferred information sources were measured in the following way. Participants were asked to indicate which persons or institutions they found suitable for providing information about the selected information needs regarding food topics out of a list of 20 options (Consumer Alliances, dietician, direct environment, education offices of the food sector, family doctor, government, the Internet, magazines, manufacturer, medical specialist, national education offices, newspapers, the Netherlands Nutrition Center, pharmacist, radio, retail trade, scientific organisations, television, written education materials, open-ended option). They were allowed to select a maximum of three information sources.

Respondents were also asked from which persons or institutions they sought information about nutrition and health in the past year. *Reliability* was measured by asking which persons or institutions were perceived as most reliable in matters of nutrition and health. The same was done for *expertise, clearness and accessibility* with respect to information sources.

Perception of own weight was measured with one question, consisting of six categories: (1) too heavy, (2) want to lose a lot of weight, (3) pay attention to weight, (4) not afraid to get fat, (5) maintain good weight and (6) too lean. *Demographic questions* recorded were gender, age and socio-economic status.

Subjects

Our target group consisted of Dutch adults aged 18-80 (mean age 48 y). We took a stratified sample from the GfK ScriptPanel, which was representative of the Dutch population regarding gender, age, education level, and residence. A total of 923 adults were selected to participate in a face-to-face interview-assisted questionnaire; 603 respondents (385 women and 218 men) completed this questionnaire, so the net response rate was 65%. In addition, 82 respondents completed a non-response questionnaire by telephone (9%). Three age groups were established, comparable to our previous qualitative studies (Van Dillen et al., 2003): youngsters (18–30 y; n=88), middle-aged (31–50 y; n=262) and elderly (51–80 y; n=253). Two weight groups were established, one consisting of those who are far too heavy, who want to lose a lot of weight or who have to pay attention to their weight (n=370; referred to as perceived overweight), and the other including those

who are not afraid to get fat, who maintain good weight or who are too lean (n=230; referred to as perceived normal weight) (no data available of three respondents). Furthermore, data on socio-economic status were retrieved from the database of GfK ScriptPanel. Two groups were established for analysis: low socio-economic status, comprising classes C and D (n=200) and high socio-economic status, comprising classes A and B (n=403).

Procedure

In the second half of 2001, a survey was carried out in a stratified sample of Dutch adults aged 18-80 y. A total of 923 respondents received an announcement letter in which they were invited to participate in a study of nutrition and communication. Next, the recruiters contacted them by telephone for making an appointment for a face-to-face interview. People who refused were asked immediately if they would answer a few questions regarding their interest in nutrition and nutrition knowledge; 82 completed this non-response questionnaire. People who agreed to participate were visited at their homes at the appointed time by one of the interviewers who filled in the questionnaire. Finally, 603 respondents completed the face-to-face interview-assisted questionnaire. The duration of each interview was about 40 min. At the end, each participant received a gift coupon.

Analysis

Data were analysed with the computer software program SPSS, version 10.0.5. SPSS stands for Statistical Package for the Social Sciences. First, descriptive data were analysed and relationships between variables were tested with Pearson correlations. Demographic profiles were generated with the cross-tabs procedure. Chi-square analysis was used to detect significant relationships. Univariate analysis tests (*t*-tests, ANOVA) were used to analyse significant differences in perceived relevance and information needs regarding food topics between subgroups, based on gender, age, weight and socio-economic status. Regarding age Bonferroni adjustment for multiple comparisons was applied. Multivariate analysis tests (logistic regression with the enter procedure) were performed to verify significant results from the univariate analysis. For all analyses, the significance level was set at 0.05.

RESULTS

Perceived relevance of food topics

Eighteen food topics were classified in order of perceived relevance (**Table 4.1**). A total of 469 respondents found a balanced diet important (78%). Other most frequently mentioned topics were fruits and vegetables, eating less fat, food hygiene, preparing and storing meals, and vitamins (category 1). These topics were rated as extremely important and therefore assigned to category 1. Moderately important food topics were sports and nutrition, lowering cholesterol, losing weight, food safety and food composition (category 2). Small groups of respondents found nutrition and drugs, carbohydrates, food allergy, genetically modified foods, minerals, European E-numbers and functional foods important (category 3).

Table 4.1 Perceived relevance and urgency of 18 different food topics mentioned by Dutch adults (N=603)

Food topic	Relevance n_1	n_1/N (%)	Urgency n_2	n_2/n_1 (%)	n_2/N (%)
Balanced diet	469	78	120	26	20
Fruit and vegetables	453	75	107	24	18
Eating less fat	334	55	96	29	16
Food hygiene	294	49	67	23	11
Preparing and storing meals	282	47	86	30	13
Vitamins	277	46	68	25	11
Sports and nutrition	154	25	48	31	8
Lowering cholesterol	136	23	47	35	8
Losing weight	128	21	65	51	11
Food safety	118	20	51	43	8
Food composition	90	15	28	31	5
Nutrition and drugs	49	8	22	45	4
Carbohydrates	46	8	14	30	2
Food allergy	42	7	15	36	2
Genetically modified foods	39	7	30	77	5
Minerals	36	6	13	36	2
European E-numbers	34	6	20	59	3
Functional foods	23	4	5	22	1

n_1 and n_2 stand for the number of people who perceived the particular food topic relevant respectively urgent.

N stands for the total number of survey respondents.

Information needs regarding food topics (urgency)

Table 4.1 also shows the information needs regarding food topics. Of the 469 respondents who mentioned a balanced diet as important, 120 expressed a need for more information (26%). For category 1, 23–30% expressed a need for more information, so more than 70% of the adults did not want more information. There is obviously no need for more information on the most important topics, indicating a discrepancy between perceived relevance and urgency of food topics. More urgent is information about topics of categories 2 en 3, such as genetically modified foods (77%), European E-numbers (59%), losing weight (51%), nutrition and drugs (45%) and food safety (43%).

Differences by gender

Table 4.2 shows significant univariate differences in perceived relevance and information needs regarding food topics between men and women (Student’s t, df=601, all p<0.05). Men found sports and nutrition, minerals, nutrition and drugs, and carbohydrates more important than women. Losing weight was more relevant for women than for men. Furthermore, women expressed a greater need for more information about losing weight. Similar differences were found in logistic regression analysis (Wald, df=1, all p<0.05).

Table 4.2 Differences in perceived relevance and information needs regarding food topics between men (n=218) and women (n=385) (df=601)

Food topic	T	P	Men (%)	Women (%)
Sports and nutrition (relevance)	3.0	0.00*	33	22
Losing weight (relevance)	-3.0	0.00*	15	25
Minerals (relevance)	2.5	0.01*	9	4
Nutrition and drugs (relevance)	2.3	0.02*	12	6
Carbohydrates (relevance)	2.0	0.04*	11	6
Losing weight (need)	-2.1	0.04*	7	13

* Also significant in logistic regression analysis

Differences by age

Table 4.3 shows significant univariate differences in perceived relevance and information needs regarding food topics between youngsters, middle-aged and elderly (ANOVA, df=600, all p<0.05). Youngsters found sports and nutrition and vitamins more important than the other age groups. Middle-aged subjects mentioned food composition, food allergy and functional foods as more relevant. Elderly attached more importance to lowering cholesterol and eating less fat. With respect

Food topics and information sources

to information needs, youngsters found information about sports and nutrition more urgent. Elderly were more interested in more information about lowering cholesterol. Significant results were also found in multivariate analysis by logistic regression analysis (Wald, df=1, all $p < 0.05$) with the exception of food composition, food allergy and functional foods.

Table 4.3 Differences in perceived relevance and information needs regarding food topics between respondents aged 18–30 y (n=88), 31–50 y (n=262) and 51–80 y (n=253) (df=600)

Food topic	F	P	18–30 y (%)	31–50 y (%)	51–80 y (%)
Lowering cholesterol (relevance)	18.9	0.00*	6 ^a	18 ^b	34 ^{ab}
Sports and nutrition (relevance)	17.5	0.00*	46 ^{ab}	29 ^{ac}	15 ^{bc}
Eating less fat (relevance)	6.0	0.00*	46 ^a	51 ^b	63 ^{ab}
Vitamins (relevance)	5.8	0.00*	63 ^{ab}	44 ^a	42 ^b
Food composition (relevance)	3.4	0.03	6 ^a	17 ^a	16
Food allergy (relevance)	3.1	0.04	5	10	5
Functional foods (relevance)	3.1	0.05	5	6 ^b	2 ^b
Sports and nutrition (need)	9.6	0.00*	17 ^a	10 ^b	3 ^{ab}
Lowering cholesterol (need)	8.9	0.00*	0 ^a	6 ^{ab}	13 ^b

Different superscripts a, b, and c mean significant differences after Bonferroni adjustment for multiple comparisons

* Also significant in logistic regression analysis.

Differences by weight

Table 4.4 shows univariate differences between respondents with normal weight and those with overweight (Student's t, df=598, all $p < 0.05$). People of normal weight attached more importance to minerals, carbohydrates, and European E-numbers. Overweight people found losing weight, lowering cholesterol, and eating less fat more important. In addition, people of normal weight were more interested in more information about carbohydrates, while overweight people wanted more information about losing weight. Significant multivariate results were also found when using logistic regression analysis (Wald, df=1, all $p < 0.05$).

Table 4.4 Differences in perceived relevance and information needs between respondents with perceived normal weight (n=230) and perceived overweight (n=370) (df=598)

Food topic	T	P	Normal weight (%)	Overweight (%)
Losing weight (relevance)	-7.9	0.00*	5	31
Minerals (relevance)	2.9	0.00*	10	4
Carbohydrates (relevance)	2.8	0.01*	11	5
Lowering cholesterol (relevance)	-2.4	0.02*	17	26
Eating less fat (relevance)	-2.2	0.03*	50	59
European E-numbers (relevance)	2.2	0.03*	8	4
Losing weight (need)	-6.4	0.00*	1	17
Carbohydrates (need)	2.6	0.01*	4	1

* Also significant in logistic regression analysis.

Differences by socio-economic status

Table 4.5 shows that people with a high socio-economic status perceived functional foods and European E-numbers as more important, while people of low socio-economic status perceived eating less fat as more important (Student's t, df=601, all p<0.05). Furthermore, people of high socio-economic status expressed a greater need for information about food composition. Multivariate analysis with logistic regression analysis (Wald, df=1, all p<0.05) revealed significant results for perceived relevance of functional foods and eating less fat and an information need regarding food composition.

Table 4.5 Differences in perceived relevance and information needs between respondents with low socio-economic status (LSES; n=200) and high socio-economic status (HSES; n=403) (df=601)

Food topic	T	P	LSES (%)	HSES (%)
Functional foods (relevance)	-3.0	0.00*	1	6
Eating less fat (relevance)	2.7	0.01*	63	52
European E-numbers (relevance)	-2.0	0.03	3	7
Food composition (need)	-2.2	0.03*	2	6

* Also significant in logistic regression analysis.

Preferred information sources

Table 4.6 shows the most often mentioned information sources for providing information about the 18 food topics. It is important to note that we did not intend to obtain all information from every participant. What we aimed to learn was assigned importance and information needs regarding food topics, and preferred information sources. So we aimed to provide the most relevant information summarised in Table 4.6. Education offices of the food sector, written education materials, the Netherlands Nutrition Center, the family doctor and national education offices were often mentioned for most food topics. For health-related food topics, such as lowering cholesterol, losing weight and food allergy, the family doctor was mentioned as the most suitable information source. The family doctor also ranked among the highest with respect to nutrition and drugs, and minerals.

Table 4.7 shows the perceived reliability, perceived expertise, clearness and accessibility of different sources for providing information about nutrition and health, indicating that the family doctor, the dietician and education offices of the food sector ranked among the highest.

DISCUSSION

We will address specifically three problems: a) discrepancy between relevance and urgency; b) the practical results, both for tailoring to information needs as well as for the possible use of nutrition information sources; and c) preferences for information sources.

Discrepancy between relevance and urgency

Our results were in agreement with other studies about the relevance of food topics, namely balanced diet (SWOKA, 1999; Lappalainen et al., 1998; Falk et al., 2001), fruit and vegetables (Lappalainen et al., 1998), and eating less fat (Lappalainen et al., 1998; SWOKA, 1999). It is possible that respondents chose these topics reflecting dietary guidelines in category 1 (high relevance), because they are well covered by nutrition communication. Food topics in categories 2 and 3 (moderately and low relevance) are only important for a small group of people who are engaged with the particular topic.

Table 4.6 Matrix reflecting the three information sources with the highest potential to communicate effectively to consumers about a certain food topic

Food topic	Source 1	Source 2	Source 3
Balanced diet	Education offices food sector	Magazines	Nutrition Center
Fruits and vegetables	Education offices food sector	Retail trade	Magazines
Eating less fat	Education offices food sector	National education offices	Written education materials
Food hygiene	Education offices food sector	Consumer Alliances	Written education materials
Preparing and storing meals	Education offices food sector	Retail trade	Magazines
Vitamins	Education offices food sector	Nutrition Center	Written education materials
Sports and nutrition	Written education materials	National education offices	Direct environment
Lowering cholesterol	Family doctor	National education offices	Education offices food sector
Losing weight	Family doctor	Education offices food sector	Nutrition Center
Food safety	Education offices food sector	Scientific organisations	Television
Food composition	Education offices food sector	Nutrition Center	Manufacturer
Nutrition and drugs	Pharmacist	Family doctor	National education offices
Carbohydrates	Education offices food sector	Nutrition Center	Direct environment
Food allergy	Family doctor	Nutrition Center	Education offices food sector
Genetically modified foods	Scientific organisations	Education offices food sector	Consumer Alliances
Minerals	Education offices food sector	Written education materials	Family doctor
European E-numbers	Education offices food sector	Written education materials	Scientific organisations
Functional foods	Written education materials	National education offices	Education offices food sector

Food topics and information sources

Table 4.7 Rank orders for perceived reliability, perceived expertise, clearness, accessibility and overall assigned to information sources with respect to nutrition and health

Information source	Reliable	Expertise	Clear	Accessible	Overall
Family doctor	1	2	2	1	1
Dietician	2	1	1	2	1
Education offices food sector	3	3	3	3	3
National education offices	4	4	4	7	4
Consumer Alliances	5	8	5	9	5
Pharmacist	6	9	11	12	9
Medical specialist	7	5	6	11	6
Nutrition Center	8	6	10	15	11
Magazines	9	10	8	5	7
Television	10	13	9	6	9
Direct environment	11	12	13	8	12
Written education materials	12	14	12	13	13
Scientific organisations	13	7	15	18	14
Retail trade	14	16	14	10	15
Internet	15	11	7	4	8
Government	16	15	16	17	16
Manufacturer	17	17	17	16	17
Newspapers	18	18	18	14	18
Radio	19	19	19	19	19

Urgency was generally low for the most important food topics. A possible explanation for this discrepancy might be existing nutrition knowledge: our study revealed high scores with respect to knowledge of dietary guidelines in accordance with other studies (Probart et al., 1989; Nutrition Center, 1998). It is also possible that there is in fact no need, because general principles are taught in schools and unambiguously communicated to the public by the Netherlands Nutrition Center. In addition, basic nutritional advice has changed very little in the past 20 y (Goldberg, 2000). A last explanation might be the modern use of information on demand. We will discuss this later on.

Tailoring to information needs

Information needs are very diverse and are changing over time (Te Molder, 1999). Certain life events or societal changes can trigger new information needs and others are fulfilled in the

meantime. Twelve years ago, Dutch adults were most interested in food safety (SMO, 1991). Our respondents had some information needs regarding safety-related food topics, which led to uncomfortable feelings, because they are invisible, intangible and beyond consumer's control (Slovic, 1987). A reverse relationship between perceived risk and real threat exists: experts judge microbiological hazards to be the main risk, but the public is far more concerned about perceived hazards such as food additives (Miles & Frewer, 2001). In addition, our study showed there were also information needs regarding health-related food topics, possibly due to recently experienced health problems. Such a life event is the trigger for actively seeking for information in the field of nutrition and health. 37% of our respondents expressed that they sought nutrition information in the past year, compared to 30% in a previous study in the United States (Cass Ryan & Gates, 1988).

Our results imply that subgroups by gender, age, perceived weight or socio-economic status do not have to be targeted separately, except for food topics, like losing weight, sports and nutrition, lowering cholesterol, carbohydrates, and food composition. On the basis of our results we are able to tailor the information needs regarding these five food topics to a specific subgroup and preferred information source.

Losing weight was perceived more urgent by women, which was in accordance with European and American studies (European Commission, 1998; Holgado et al., 2000; Chapman & Maclean, 1993). In agreement with an American study, losing weight was an information need among overweight people (Nowak, 1998). In the Netherlands, 40% of men and 30% of women are overweight, and 10% are suffering from obesity (Van Oers, 2002). Therefore, we recommend family doctors to bring up weight in their face-to-face contacts with their patients. Interestingly, from 2002 the Netherlands Nutrition Center runs a campaign to prevent overweight. The body image should be realistic and achieved through a combination of healthy diet and physical activity.

Sports and nutrition was more urgent among youngsters, in agreement with European and American studies (European Commission, 1998; Nowak, 1998). Surprisingly, a recent Dutch review showed that young people in particular were insufficiently physically active and ate insufficient fruit and vegetables (Van Oers, 2002). We recommend that existing written education materials should be scanned for their suitability for young people, otherwise new leaflets should be composed, or new communication channels should be considered. If leaflets are to be used, they should include peripheral cues, like attractive role models. It is also important to disseminate these leaflets at places where they band together and where they are receptive to receiving such information, which might include clubs, movie theatres, pubs or popular restaurants.

Lowering cholesterol was an information need among the elderly, which was in accordance with studies in the United States and New Zealand (Krinke, 1990; Silvester & Horwath, 1991). A possible explanation might be health status. We recommend Dutch family doctors to make use of the NHG standards and patient information letters, composed by the Dutch College of General Practitioners (Van Binsbergen & Drenthen, 2003).

Carbohydrates was another information need to be fulfilled among people of normal weight, possibly reflecting interest in nutrients and different dietary options. Our recommendation to education offices of the food sector is to stress the importance of carbohydrates as an energy source.

Food composition was an information need among people with high socio-economic status, possibly due to high nutrition awareness. In the Netherlands, obesity, cholesterol and high blood pressure are more prevalent in low socio-economic groups (Van Oers, 2002; Hulshof et al., 2003). Our recommendation is to involve education offices of the food sector to satisfy the information need about food composition.

Preferences for information sources

For all other than the five above-mentioned food topics (like balanced diet), a population-wide strategy should suffice, utilising the preferred information source to reach people who are not (yet) interested in information about a certain food topic.

Education offices of the food sector, such as the Dutch Dairy Bureau, are altogether considered suitable for almost every topic, possibly because of their knowledge of practical information. During the past decade, education offices were more involved with nutrition communication with the help of nutrition experts. It remains questionable if consumers really know what these education offices are and about the intermingling interests of the food industry, but our results revealed that the education offices were perceived as highly reliable and expert. Next, *written education materials* were considered suitable for more detailed information about complex topics, such as European E-numbers. *The Netherlands Nutrition Center* was preferred for topics related to the dietary guidelines. It is remarkable that the Netherlands Nutrition Center is not mentioned for eating less fat, because in the past decade the Center ran a campaign named 'Fat Watch'. Furthermore, the *family doctor and national education offices*, such as the National Heart Foundation, were preferred for health-related food topics. Previous studies found that health professionals (Holgado et al., 2000), physicians (Kunkel et al., 1986; Raab et al., 1989; Probart et al., 1989) and family doctors (Worsley, 1989; Silvester & Horwath, 1991; Hiddink et al., 1997a) were preferred as information source over other potential sources. Furthermore, family doctors were

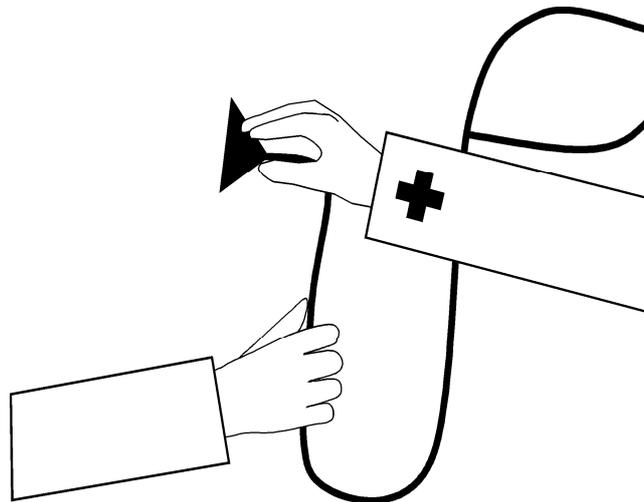
also regarded as the most reliable nutrition information source (Worsley, 1989; Serra-Majem et al., 1999). Family doctors are in a unique position because of high referral rates and high perceived expertise, and reach practically all segments of the population (Hiddink et al., 1997a). Therefore, it is important that medical students and practising physicians are trained in clinical nutrition (Raab et al., 1989; Walker, 2003; Maiburg et al., 2003). Furthermore, family doctors should augment their discussion with ready availability of written materials, for instance patient information letters (Van Binsbergen & Drenthen, 2003). A European study showed that the main source of information about a health-related topic appeared to be personal contact with family, friends or neighbours (Budtz & Witt, 2002). However, we did not find such results.

In contrast to other studies, *traditional mass media* are hardly mentioned as information source (Cass Ryan & Gates, 1988; Medeiros et al., 1991; De Almeida et al., 1997; Buttriss, 1997) and are probably more suited for attracting attention, but not for detailed explanations (Worsley, 1989). Other reasons might be the low level of trust (Holgado et al., 2000; Buttriss, 1997) and reliability (Worsley, 1989). An American study indicated that mass media score negative for understanding of nutrition and can override the positive influence of other sources (Medeiros et al., 1991).

Furthermore, *new media* were not preferred, but the Internet was among the highest for accessibility. This result forms an opportunity for information on demand. Consumers who are at the moment not yet interested in information, might be triggered by a life-event, and transform a relevant food topic into an urgent food topic. Therefore, we consider it important that reliable information is available at the Internet web-sites at the time consumers need this. Of course, consumers might also choose to contact health professionals who are accessible, if they need information.

CHAPTER 5

EXPLORATION OF POSSIBLE CORRELATES OF NUTRITION AWARENESS AND THE RELATIONSHIP WITH NUTRITION-RELATED BEHAVIOURS: RESULTS OF A QUANTITATIVE CONSUMER STUDY



Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Exploration of possible correlates of nutrition awareness and the relationship with nutrition-related behaviours: results of a quantitative consumer study. *Submitted for publication.*

ABSTRACT

Objective: To unravel the concept of nutrition awareness, as it relates to risky personal nutrition-related behaviours, and to assess the socio-demographic and psycho-social correlates of nutrition awareness.

Design: Data were collected in a cross-sectional study with the aid of a face-to-face interview-assisted questionnaire that was based on the Precaution Adoption Process Model and Stages of Change Model.

Setting: Dutch consumer homes.

Participants: 603 Dutch adults aged 18 to 80, selected from a panel.

Main outcome measures: Nutrition awareness and nutrition-related behaviours.

Analysis: Multivariate variance analysis tests, chi-square tests, and multiple linear regression analyses ($p \leq 0.05$).

Results: Our model explains nutrition awareness well (explained variance 53.7%). Psycho-social correlates were involvement with nutrition, health awareness, association with healthy food, perceived relevance of eating less fat, association with necessity, and perceived attributes of independent organisations. Socio-demographic correlates were gender and age. The relationship between nutrition awareness and nutrition-related behaviours proved to be very complicated.

Conclusions and implications: The value of our study is that it unravels the concept of nutrition awareness. Understanding the correlates of nutrition awareness can contribute to a more effective application of behavioural change models. Our results support increasing involvement with nutrition through personalising and tailoring to the motivational stage.

Keywords: nutrition awareness, nutrition-related behaviours, The Netherlands, consumers

Acknowledgements: We would like to thank the market research office GfK (Lianne van der Wijst and Kamieke van de Riet) for their collaboration to this research. We gratefully thank the participants for their time and contributions. Finally, we extend our appreciation to the Dutch Dairy Association for financial support.

INTRODUCTION

In the Netherlands, fat intake is above daily-recommended levels, while fruit and vegetable intakes are below recommended levels (Nutrition Center, 1998). Previous studies showed a gap between perceived and actual dietary intakes (Brug et al., 1994; Lechner et al., 1997; Shim et al., 2000). Awareness of personal dietary intakes seems to be important for the development of successful nutrition interventions. Lack of awareness has serious consequences, because people who believe they eat healthily are not motivated to change their nutrition behaviour (Van Assema et al., 2001). Creating awareness is the first step in behavioural change and it is the primary concept of the Precaution Adoption Process Model (Weinstein, 1988). According to the Stages of Change Model, awareness of personal risk behaviour is essential in motivating people to move from precontemplation to further stages of behavioural change (Prochaska & Velicer, 1997).

First, two qualitative studies were conducted to measure pre-existing knowledge, attitudes, and beliefs about food. These studies left the impression that Dutch adults lacked nutrition awareness (Van Dillen et al., 2003). On the basis of several empirical studies, we developed a hypothetical model for nutrition awareness (Van Dillen et al., 2003), using socio-demographic as well as psycho-social correlates, including individual (Worsley & Worsley, 1991; Norman & Bennett, 1996; IEFS, 1996; Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999; GfK, 1999; Van Gaasbeek & Hansman, 2000; Falk et al., 2001) and environmental (Kunkel et al., 1986; Worsley, 1989; Probart et al., 1989; Medeiros et al., 1991; De Almeida et al., 1997; Buttriss, 1997; Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999; Falk et al., 2001) variables. In this model, our working definition of nutrition awareness was as follows: a realisation of one's own personal risk behaviour regarding nutrition (Weinstein, 1988). Few studies have actually explored the relationship between nutrition awareness and socio-demographic correlates (Lechner et al., 1997; De Graaf et al., 1997; Glanz et al., 1997; Sapp & Jensen, 1997; Girois et al., 2001). Two studies (Lechner et al., 1997; Glanz et al., 1997) compared subjective food intake with objective food intake (with the aid of a food frequency questionnaire) in order to construct an awareness variable. In another two studies (Sapp & Jensen, 1997; Girois et al., 2001), awareness was measured using several diet-health linkages, and in a separate study (De Graaf et al., 1997) it was measured using the Stages of Change Model. However, no clear definition of nutrition awareness emerged. Therefore, we considered unravelling the concept nutrition awareness to be a useful effort. In this article, a novel approach is embraced wherein nutrition awareness is comprehensively measured using several propositions, that reflect Dutch dietary guidelines (Nutrition Council of the

Netherlands, 1986). In comparisons with the above-mentioned studies, care should be taken due to the alternative measurement methods we chose to employ.

METHODS

Study population and design

Our study population was Dutch adults aged 18-80 years. A stratified sample of 923 respondents was taken from the market research office GfK Script Panel, which is representative of the Dutch population with regard to gender, age, education level, and residence (GfK, 2000). 603 respondents agreed to participate in the face-to-face interview-assisted questionnaire. Response rate was 65%. The sample consisted of 385 women (64%) and 218 men (36%), meaning that women were slightly overrepresented. The mean age was 48 year. A non-response questionnaire was conducted by telephone with 82 respondents (9%), containing questions about nutrition knowledge, nutrition interest, and nutrition-related behaviours.

Questionnaire

Based on our qualitative (Van Dillen et al., 2003) and empirical studies (Kunkel et al., 1986; Worsley, 1989; Probart et al., 1989; Medeiros et al., 1991; Worsley & Worsley, 1991; Norman & Bennett, 1996; IEFS, 1996; De Almeida et al., 1997; Buttriss, 1997; Hiddink et al., 1997a; Berenschot, 1999; SWOKA, 1999; GfK, 1999; Van Gaasbeek & Hansman, 2000; Falk et al., 2001), a comprehensive model for nutrition awareness was developed. We decided to condense that model down to its most important variables, which resulted in our hypothetical model for nutrition awareness (Van Dillen et al., 2003). The dependent variable for measurement was *nutrition awareness*. We decided not to include a stage of change measure, since we were only interested in the first stages of behavioural change. We took a novel approach by measuring nutrition awareness with the use of several propositions, to reflect dietary guidelines (Nutrition Council of the Netherlands, 1986). For the construction of this variable, we took eight items from the general health interest scale (Roininen et al., 1999; item 1-8), three items from the health awareness scale (Oude Ophuis, 1989; item 9-11) and six self-composed items (item 12-17). Nutrition awareness was thus assessed by 17 propositions using a five-point Likert scale (strongly agree-strongly disagree) (Cronbach's $\alpha = 0.89$). **Table 5.1** shows the results of the factor analysis. Consequently, we constructed one scale by summing up the 17 items.

Correlates of nutrition awareness

Table 5.1 Description of the items of nutrition awareness scale

Items	Factor loading
1. The healthiness of food has little impact on my food choices	0.61
2. I am very particular about the healthiness of food I eat	0.63
3. I eat what I like and I do not worry much about the healthiness of food	0.66
4. It is important for me that my diet is low in fat	0.66
5. I always follow a healthy and balanced diet	0.69
6. It is important for me that my daily diet contains a lot of vitamins and minerals	0.69
7. The healthiness of snacks makes no difference to me	0.59
8. I do not avoid foods, even if they may raise my cholesterol	0.59
9. I do not want to ask myself all the time whether the things I eat are good for me	0.59
10. I am prepared to leave a lot, to eat as healthy as possible	0.70
11. I think it is important to know how to eat healthy	0.70
12. I have the impression that other people pay more attention to healthy eating than I do	0.57
13. I think it is important to eat two pieces of fruit and 200 gram vegetables a day	0.63
14. I pay attention that I do not eat too much	0.53
15. I take care that I eat a balanced diet	0.55
16. I take care that I eat regularly	0.40
17. I pay attention that I do not use too much sugar	0.57

Below we will describe successively independent variables (environmental and individual) and external variables (including socio-demographic).

Environmental variables were operationalised as *perceived attributes of nutrition information sources* and measured using four questions, pertaining to which people or institutions were spontaneously perceived as: most reliable, possessing the most expertise, having the greatest clearness, and as being most accessible in matters of health and nutrition (Van Dillen et al., 2004). Initially, we intended to include all of the information sources into just three factors, namely commercial, neutral and social. However, factor analysis did not support the use of to such straightforward factors. Therefore, we decided to compute an overall score for each single source based on perceived reliability, expertise, clearness and accessibility (Cronbach's α 's between 0.69 and 0.92). An additional factor analysis resulted into seven reliable factors; Cronbach's α 's varied from 0.67 to 0.81.

In the end, eight individual variables were included. Interest in nutrition was operationalised as *involvement with nutrition* (i.e. the value placed on (new information about) nutrition), and

included one item related to the importance of the topic nutrition (Hiddink et al., 1997a) and one self-composed item related to the importance of new information about nutrition using a four-point scale (not important-very important). The new variable 'involvement with nutrition' had a Cronbach's α of 0.69. *Perception of the role of behaviour and heredity in health* (i.e. an estimation of the contribution of behavioural factors and heredity to state of health) was adopted (Hiddink et al., 1997a), measured by seven questions using a ten-point scale (very little influence-very much influence) (Cronbach's $\alpha = 0.65$). *Health awareness* (i.e. an interest in health, which is reflected in healthy food choices and physical activity) was adopted (Oude Ophuis, 1989) by 11 questions using a five-point scale (strongly agree-strongly disagree) (Cronbach's $\alpha = 0.89$). *Health locus of control (HLC)* (i.e. belief in control of health) was adopted (Wallston & Wallston, 1978) and measured using nine questions and a five-point scale. Three separate scales were constructed, namely Internal HLC (self-control; Cronbach's $\alpha = 0.66$), Powerful Others HLC (health professionals control; Cronbach's $\alpha = 0.74$) and Chance HLC (control by fate; Cronbach's $\alpha = 0.43$). Because of low internal consistency, chance HLC was not included in the analysis. Beliefs about food were operationalised as *associations with food* (i.e. the meaning attached to food in daily life) and measured with one question - asking respondents what comes to mind when thinking about the word 'food'. Factor analysis revealed no reliable factors, so we decided to include single associations. Because some associations were rarely mentioned, we used only the seven associations mentioned by more than 10% of the respondents. Attitudes toward food topics were operationalised as *perceived relevance of food topics* (i.e. importance of food topics) and measured by one question: respondents were provided with 18 food topic cards (e.g. balanced diet, eating less fat) and asked to pick out five cards that were personally relevant and to sequence them in order of importance (Van Dillen et al., 2004). Factor analysis revealed no reliable factors, so single food topics were used instead. From the 18 food topics, 11 were mentioned by more than 10% of the respondents and were thus used in the analysis. *Information needs regarding food topics* (i.e. the need for specific knowledge to obtain answers to important questions about food topics) were assessed by five questions probing as to whether respondents needed more information about the five food topics that had already been identified as important (yes-no categories) (Van Dillen et al., 2004). Since factor analysis revealed no reliable factors, single information needs were used. Our cut off line was 10% allowing seven information needs to be taken into analysis. *Information behaviour* (i.e. the way someone obtains information - both passively and actively) was assessed by one question that asked respondents spontaneously from whom (persons or institutions) they had sought information about nutrition and health over the past year (Van Dillen et al., 2004).

Socio-demographic variables, like gender, age, education level, income, lifecycle (living situation: living independently or together, having children or not), and residence were obtained from the GfK ScriptPanel database.

Nutrition-related behaviours were objectively measured in other studies (Lechner et al., 1997; Glanz et al., 1997) by means of food frequency questionnaires. Since these are very time-consuming, we took an alternative approach, using recommended amounts of eight different foods (bread, cheese on bread, meat on bread, potatoes, meat/fish, vegetables, fruits, milk(products)) for adults, as stated by the Netherlands Nutrition Center (2002). Nutrition-related behaviours were measured by means of eight items (e.g. ‘How many pieces of fruit do you eat a day?’ ‘1, 2 or 3 or more’). Factor analysis delivered no clear factor.

Data analysis

SPSS 10.5 was used for the statistical analyses. After descriptive statistics, principal component factor-analyses with varimax rotation were done in order to construct scales. Scales were verified using reliability analysis. Moreover, multivariate variance analysis tests with Hotelling’s Trace were used to analyse significant differences in individual and environmental variables between respondents with low and high nutrition awareness, based on median split. Next, chi-squares were used for associations between nutrition awareness and socio-demographic correlates. In addition, Pearson correlation coefficients between nutrition awareness and independent variables were computed. Finally, our hypothetical model for nutrition awareness was tested using a multiple linear regression, combining forward and backward procedure. Furthermore, for unravelling a possible relationship between nutrition awareness and nutrition-related behaviours, we looked at Pearson correlation coefficients, chi-squares and multiple linear regression. For all analyses, a significance level of $p \leq 0.05$ was chosen.

RESULTS

Descriptive statistics

Scores for nutrition awareness ranged between 32 and 84. The mean score was 60.35. Based on the median, two groups for nutrition awareness were established, one consisting of adults with low nutrition awareness ($n=283$; 47%) and the other being made up of adults with high nutrition awareness ($n=320$; 53%). Nutrition-related behaviours scores for eight foods were divided into three categories: consumption below, consistent with, and above daily recommended levels. It

appears that 23% met recommended levels for bread, eating five to seven slices of bread per day. About two-thirds ate the recommended one or two slices of cheese, and one or two slices of meat on their bread per day (68% respectively 66%). Next, 48% met the recommended intake level for potatoes (three to five pieces per day). The recommendation for meat/fish consumption of 100 g per day was met by 42% of the sample. Furthermore, 44% ate 200 g of vegetables per day and 39% ate two pieces of fruit. Finally, 48% consumed enough milk (products), drinking two to three glasses per day.

Differences in correlates between adults with low and high nutrition awareness

Respondents with high nutrition awareness associated food significantly more often with healthy food as compared to respondents with low nutrition awareness (26% versus 11%; $F=23.2$, $df=1$, $p=0.00$; data not shown). Adults with low nutrition awareness thought more often about tasty food than adults with high nutrition awareness (52% versus 42%; $F=5.4$, $df=1$, $p=0.02$).

Respondents with high nutrition awareness perceived food topics, such as lowering cholesterol (28% versus 16%; $F=13.8$, $df=1$, $p=0.00$) and eating less fat (61% versus 49%; $F=9.6$, $df=1$, $p=0.00$), as more relevant than respondents with low nutrition awareness. Respondents who were less aware of nutrition, perceived two food topics to be more relevant than the high nutrition awareness group, namely sports and nutrition (31% versus 21%; $F=8.8$, $df=1$, $p=0.00$) and vitamins (50% versus 42%; $F=4.5$, $df=1$, $p=0.03$). Adults with high nutrition awareness expressed a greater need for information about eating less fat (21% versus 10%; $F=14.8$, $df=1$, $p=0.00$) and about fruits and vegetables (22% versus 13%; $F=6.9$, $df=1$, $p=0.00$) than adults with low nutrition awareness.

Respondents with high nutrition awareness were more involved with nutrition ($F=187.3$, $df=1$, $p=0.00$), sought more information about nutrition ($F=8.1$, $df=1$, $p=0.01$), and held stronger beliefs related to health controlled by powerful others ($F=8.0$, $df=1$, $p=0.01$) than respondents with low nutrition awareness. Surprisingly, respondents with low nutrition awareness demonstrated higher health awareness ($F=78.1$, $df=1$, $p=0.00$) than those with high nutrition awareness.

Family doctors ($F=11.6$, $df=1$, $p=0.00$) and the government ($F=4.3$, $df=1$, $p=0.04$) were found to be the most suitable information sources for respondents with low nutrition awareness, while those with high nutrition awareness relied more on magazines ($F=6.4$, $df=1$, $p=0.01$). Respondents with high nutrition awareness found independent organisations and the media (of borderline significance) to be more suitable for providing information about nutrition and health than respondents with low nutrition awareness (**Table 5.2**). Respondents with low nutrition awareness

Correlates of nutrition awareness

found health professionals more suitable than respondents with high nutrition awareness (of borderline significance).

Table 5.2 Perceived attributes of nutrition information sources among adults with low (LNA; n=283) and high nutrition awareness (HNA; n=320) Hotelling's Trace (F=2.7, df=7, p=0.01)

Dependent variable perceived attributes of...	Min ⁱ	Max ^j	Mean (+ sd)		F	df	P
			LNA ^k	HNA ^k			
Independent organisations [0-12] ^{ah}	0	8	0.8 (1.4)	1.1 (1.8)	6.7	1	0.01
Health professionals [0-16] ^{bh}	0	12	3.4 (3.1)	2.9 (2.7)	3.9	1	0.05
Media [0-12] ^{ch}	0	12	0.5 (1.3)	0.7 (1.7)	3.9	1	0.05
Independent government education [0-8] ^{dh}	0	8	0.4 (1.0)	0.3 (0.8)	3.6	1	0.06
Food producers and distributors [0-8] ^{eh}	0	6	0.2 (0.6)	0.3 (0.8)	2.0	1	0.16
Education from food sector and the Internet [0-8] ^{fh}	0	8	1.0 (1.5)	1.1 (1.7)	1.8	1	0.18
Environment [0-8] ^{gh}	0	5	0.2 (0.8)	0.3 (0.8)	0.0	1	0.97

^a Independent organisations: Consumer Alliances, national education offices, scientific organisations

^b Health professionals: family doctor, dietician, medical specialist, pharmacist

^c Media: written education materials, television, magazines

^d Independent government education: Nutrition Center, government

^e Food producers: food manufacturers, retail trade

^f Education from food sector and the Internet: education offices of food sector, Internet

^g Environment: direct environment, newspapers

^h Range of scores for sources are given in parentheses. See Methods.

ⁱ Min: minimum score.

^j Max: maximum score.

^k Sd: standard deviation.

The higher the score, the higher the attributes of a group nutrition information sources were perceived, which means that they were perceived as more suitable.

Further analysis looking at men (n=218) and women (n=385) with respect to nutrition awareness, found significant differences ($\chi^2=52.6$, df =1, p=0.00). Men were balanced between low and high nutrition awareness, while significantly more women expressed high nutrition awareness (77%). Age was also significant: 23% were young (18-30y), 49% were middle-aged (31-50y), and 28% were old (51-80y) in the low nutrition awareness group, whereas 8% were young, 38% middle-aged

and 54% old in the high nutrition awareness group ($\chi^2=51.3$, $df =2$, $p=0.00$). Nutrition awareness was also associated with having children ($\chi^2=18.3$, $df =1$, $p=0.00$). Other socio-demographic variables were not significantly different.

Regression model

First, we tested our hypothetical model for nutrition awareness (Van Dillen et al., 2003). Nutrition awareness was best predicted by involvement with nutrition (that is value placed on (new information about) nutrition), which explained 31.9% of the variance (**Table 5.3**). Health awareness added 9.4%, association with healthy food 2.4%, perceived relevance of eating less fat 1.6%, association with necessity 1.0%, perceived attributes of independent organisations 0.7%, and perceived relevance of vitamins 0.9%. Gender and age added 5.8%, 3.4% and 2.4% respectively. The model explained 53.7% of the total variance (**Figure 5.1**).

Table 5.3 Regression model for nutrition awareness (n=603)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Involvement with nutrition ^a	0.565	0.319	0.319	16.8	0.57	0.00	0.57
2	Health awareness ^b	0.643	0.413	0.094	-9.8	-0.32	0.00	-0.46
3	Association with healthy food ^c	0.661	0.437	0.024	5.0	0.16	0.00	0.25
4	Perceived relevance of eating less fat ^d	0.673	0.453	0.016	4.2	0.13	0.00	0.14
5	Association with necessity	0.680	0.463	0.010	3.3	0.10	0.00	0.08
6	Perceived attributes of independent organisations	0.686	0.470	0.007	3.0	0.09	0.00	0.11
7	Perceived relevance of vitamins ^e	0.692	0.479	0.009	-3.1	-0.10	0.00	-0.13
8	Gender	0.716	0.513	0.034	6.4	0.19	0.00	0.31
9	Age	0.733	0.537	0.024	5.6	0.16	0.00	0.30

^a Involvement with nutrition: the value placed on (new information about) nutrition.

^b Health awareness: Interest in health, which is reflected in healthy food choices and physical activity.

^c Association with healthy food: meaning attached to food in daily life is healthy food.

^d Perceived relevance of eating less fat: importance of food topic eating less fat.

^e Association with necessity: meaning attached to food in daily life is necessity.

^f Perceived attributes of independent organisations: perceived suitability of Consumer Alliances, national education offices, scientific organisations.

^g Perceived relevance of vitamins: importance of food topic vitamins.

Correlates of nutrition awareness

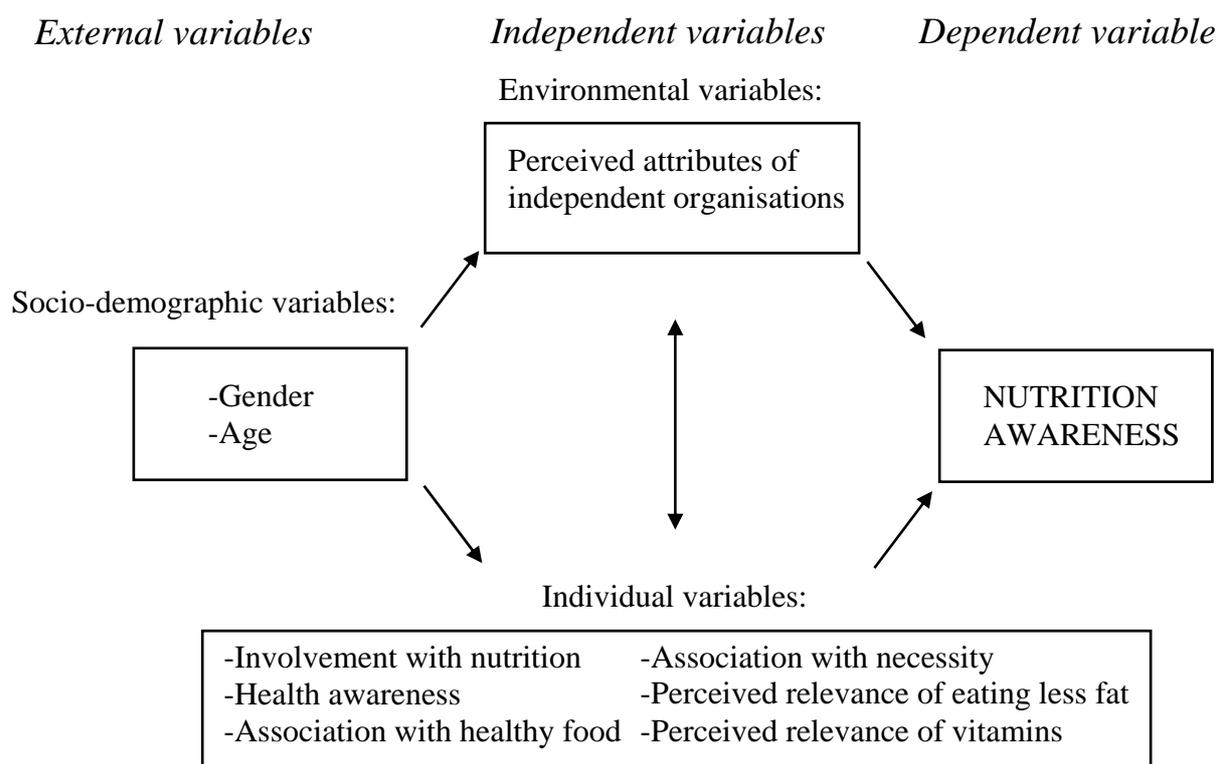


Figure 5.1 Model for nutrition awareness

The relationship nutrition awareness and nutrition-related behaviours

The highest correlation was found between nutrition awareness and fruit consumption ($r=0.30$, $p=0.00$). The relationship with vegetable consumption was also positive ($r=0.23$, $p=0.00$), while the others were negative, namely meat/fish ($r=-0.27$, $p=0.00$), meat on slices of bread ($r=-0.16$, $p=0.00$), potato ($r=-0.15$, $p=0.00$), and bread consumption ($r=-0.10$, $p=0.02$). Relationships with cheese on slices of bread and milk consumption were not significant.

Adults with low nutrition awareness were more likely to consume three to five potatoes and five to seven slices of bread per day (following the recommendation) than adults with high nutrition awareness (55% versus 45%, $\chi^2=7.7$, $df=2$, $p=0.02$ respectively 57% versus 43%, $\chi^2=19.7$, $df=2$, $p=0.00$). The group with high nutrition awareness was more likely to consume two pieces of fruit (63% versus 37%, $\chi^2=31.5$, $df=2$, $p=0.00$), 100 g meat/fish (62% versus 38%, $\chi^2=29.2$, $df=2$, $p=0.00$), 200 g vegetables (53% versus 47%, $\chi^2=17.0$, $df=2$, $p=0.00$), one or two slices of meat on their bread (53% versus 47%, $\chi^2=14.0$, $df=2$, $p=0.00$), and two or three milk products per day (53% versus 47%, $\chi^2=10.2$, $df=2$, $p=0.01$) in accordance with the recommendations, as compared to the low nutrition awareness. Respondents with high nutrition awareness did not consume more cheese on their bread than people with low nutrition awareness (55% versus 45%, $\chi^2=4.0$, $df=2$, $p=0.14$).

The variance in fruit consumption was explained by nutrition awareness with 15.3%. Nutrition awareness was also a predictor of vegetable (11.3%), meat/fish (5.4%), and meat on slices of bread consumption (2.6%), but not a predictor for bread, cheese on slices of bread, potato and milk consumption.

DISCUSSION

Our model explains nutrition awareness rather well (explained variance 53.7%). Socio-demographic correlates were gender and age. Psycho-social correlates were involvement with nutrition, health awareness (together 41%), while the others appear to be relatively minor, namely association with healthy food, perceived relevance of eating less fat, association with necessity, and perceived attributes of independent organisations. The relationship between nutrition awareness and nutrition-related behaviours proved to be very complicated.

As found in other studies (De Graaf et al., 1997; Glanz et al., 1997; Sapp & Jensen, 1997; Girois et al., 2001), women tended to be more aware of nutrition than men. The association of age with nutrition awareness is less consistent. In accordance with another study (Sapp & Jensen, 1997), the elderly appeared to be more nutritionally aware. A pan-European study (De Graaf et al., 1997) on consumer attitudes about nutrition found that people over 25 were more likely to be nutritionally aware, while other studies (Glanz et al., 1997; Girois et al., 2001) found no significant difference. However, that different measurement methods were used in these comparisons should be kept in mind.

To our knowledge, no other studies analysed the psycho-social correlates for nutrition awareness. As expected, adults with high nutrition awareness associated food more often with health, whereas adults with low nutrition awareness associated food more often with taste. Apparently, taste is important for the latter group. This is supported by the pan-European study, in which respondents in the precontemplation stage (low nutrition awareness) found taste more important, while people in maintenance stage (high nutrition awareness) found that health was more important (De Graaf et al., 2001).

With respect to food topics, lowering cholesterol and eating less fat were perceived as being more relevant by respondents with high nutrition awareness. It is interesting that they choose these specific food topics, which were actually multi-dimensional and complex. The fat guideline contains complex nutrition information and as such, has been reported as being conceptually difficult for consumers to understand (Keenan et al., 2002). Sports and nutrition, and vitamins were

perceived as more relevant by adults with low nutrition awareness, probably because they had a limited view of when nutrition is important.

As expected, involvement with nutrition was higher among respondents with high nutrition awareness and this appeared to be the strongest correlate for nutrition awareness (explained variance 31.9%). Involvement is an important concept in the Elaboration Likelihood Model (Petty & Cacioppo, 1986). People with high involvement take the central route to persuasion, after diligent consideration of the information available. This is in line with other results, showing that people with high nutrition awareness found media in general and magazines in particular more suitable. Although media often do provide misleading information, people with high nutrition awareness were probably more able to discriminate between incorrect and correct information. People with low involvement rely more on peripheral cues, such as reliable and expert sources, and our results showed that people with low nutrition awareness relied more on health professionals in general and family doctors in particular. In our study, suitability scores were the highest for family doctors, dieticians, and education offices of the food sector (Van Dillen et al., 2004). In another study, family doctors and dieticians were also the leading information sources (Hiddink et al., 1997a). Contradictory to another study (Girois et al., 2001), health awareness and nutrition awareness were negatively associated. Apparently, nutrition awareness deals with a very specific part of health awareness, which suggests further investigation is needed.

Some relationships between nutrition-related behaviours and nutrition awareness were expressed, especially for fruits and vegetables. According to previous studies (Krebs-Smith et al., 1995; Van Duijn et al., 2001), awareness was strongly associated with increased fruit and vegetable intake. Respondents with high nutrition awareness ate more often, following recommendations, whereas people with low nutrition awareness overruled the recommendations by eating too much carbohydrates (e.g. bread and potatoes) and fat (e.g. cheese and meat). Possibly, adults with high nutrition awareness more often choose alternatives: rice, pasta and meat-replacements.

There were some limitations. Firstly, women were overrepresented in this study. Secondly, on the basis of cross-sectional design, one cannot make predict causality between correlates and nutrition awareness. Moreover, nutrition-related behaviours were not measured with a food frequency questionnaire.

IMPLICATIONS FOR RESEARCH AND PRACTICE

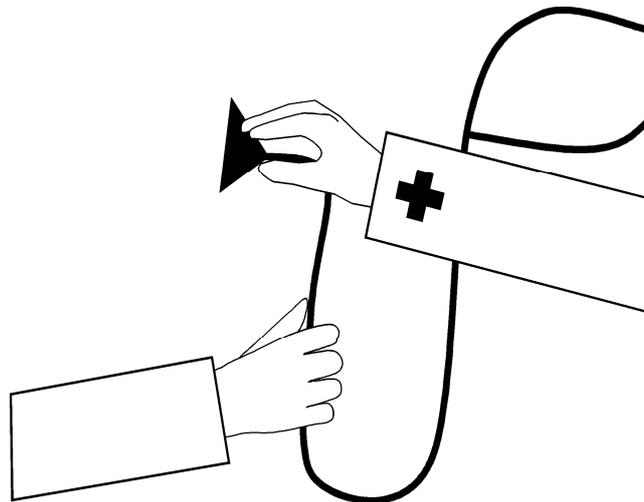
The value of our study lies in its unravelling of the concept nutrition awareness. Understanding the correlates can contribute to a more effective application of behavioural change models (Weinstein, 1988; Prochaska & Velicer, 1997). Most behaviour change interventions are designed for individuals who are already prepared for action (Campbell et al., 1994). However, action-orientated advice is inappropriate for people who are still unaware of personal risk behaviour. Communication strategies such as feedback, education, and media campaigns (Prochaska & Velicer, 1997) aimed at consciousness raising can affect a shift from precontemplation (unaware) to contemplation (aware) stage.

Our study has shown that involvement with nutrition to be the most important correlate for nutrition awareness. Involvement can be increased using the person's name and other personal characteristics, and tailoring to the motivational stage (Kristal et al., 1999). Adults at precontemplation stage can be provided with personalised feedback, for instance estimates of usual nutrient intake. Furthermore, comparisons with recommended and peer group average intake levels, can help adults making more realistic assessments, as applied in computer-tailoring and self-tests (Oenema & Brug, 2003).

Since adults with high nutrition awareness relied on the media, scientific organisations need to better engage and communicate with the media. Moreover, a novel finding is that health professionals are especially appropriate for providing nutrition information to adults with low nutrition awareness. Appropriate nutrition training should be offered. The question remains as to whether health professionals are capable of motivating these patients. This demands further investigation.

CHAPTER 6

IDENTIFICATION OF NUTRITION COMMUNICATION STYLES AND STRATEGIES: A QUALITATIVE STUDY AMONG DUTCH GPs



Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Identification of nutrition communication styles and strategies: a qualitative study among Dutch GPs.

Submitted for publication.

ABSTRACT

Objective: The objectives of this study were to identify nutrition communication styles of Dutch GPs, their strategies regarding nutrition communication and nutrition information seeking behaviours. Another aim is to provide a hypothetical model for nutrition communication style, including psycho-social and socio-demographic variables.

Methods: Nine focus groups with 81 GPs were used to obtain GPs' perceptions of nutrition communication. Data were analysed with the computer software program NUD*IST.

Results: Five nutrition communication styles were identified, namely informational, reference, motivational, confrontational and holistic style. Referring to a dietician, providing advice according to dietary guidelines, and offering written education materials were mentioned as strategies regarding nutrition communication. GPs sought nutrition information in scientific studies, specialist literature, and postgraduate training courses.

Conclusion: The informational style of nutrition communication was dominant among Dutch GPs. GPs hardly provided maintenance advice for nutrition behaviour. Many GPs referred patients to dieticians, who were viewed as colleagues. GPs tried to get basic information about nutrition by scanning the literature, but they were seldom actively involved in seeking specific nutrition information. Although GPs felt that patients expect expert nutrition information, they perceived their nutrition knowledge as restricted.

Practice implications: We advise to raise self-efficacy of GPs regarding nutrition communication and to build good collaboration with dieticians.

Keywords: Doctor-patient communication; general practice; communication style; health promotion; nutrition, qualitative research

Acknowledgements: We thank the participating GPs and the market research office Gfk (Lianne van der Wijst, Linda Ruijten, Jorien Schaap).

INTRODUCTION

The general practitioner (GP) is being more and more confronted with patients who suffer from nutrition-related diseases, like coronary heart disease, type 2 diabetes, and obesity. In these cases, the GP has to inform patients in the process of decision-making about their treatment. In addition, GPs are uniquely placed to provide effective health promotion advice about nutrition. Therefore, attention to GPs' communication style is important.

A communication style serves as a pragmatic function in that it represents a set of responses that are readily available and appropriate for communicating across various situations (Street, 2002). Research on doctor-patient communication reveals a number of positive and negative effects of the GP's communication style on outcomes, such as patient satisfaction, health status, and compliance (Deveugele et al., 2002). For example, affiliative communication styles had a positive effect on patient satisfaction, while dominant communication styles showed a negative effect on patient satisfaction (Klein Buller & Buller, 1987). Roter et al. (1997) revealed five distinct communication styles, namely narrowly biomedical (giving biomedical information), expanded biomedical (asking questions), biopsychosocial (biomedical and psychosocial exchange), psychosocial (psychosocial exchange), and consumerist (answering questions). This study showed that the majority of the physicians used only one style in most of their consultations. Lawson (2002) revealed that physicians and nurse practitioners used informational (being attentive) and controlling communication styles (giving directions). Coleman et al. (2004) studied GPs' confrontational and non-confrontational communication styles in order to discuss smoking with patients.

These three studies assessed what GPs actually do in their busy practice, although many other studies took a normative approach, while assessing performances of GPs according to current standards. In our study, we joint with the three studies, which concerned general communication styles. However, nutrition concerns a special topic, which is often prevention-tinted. We assume that communication about nutrition requires more specific communication styles. Therefore, we try to understand in this study how GPs dealt with nutrition. As far as we know, specific nutrition communication styles were not studied before. Knowledge of one's nutrition communication style is important, because this offers the opportunity of giving advice to GPs, dependent on their nutrition communication style.

Regardless of one's typical communication style, GPs also adapt their responses to situation-specific considerations. In this case we talk about strategies. Communication strategies were defined as cognitive-affective factors that account for adaptation based on strategic considerations,

like goals or purpose (Street, 2002). So independent of his predominant style, a GP can use a set of different strategies regarding nutrition communication. In two studies, these strategies were defined as nutrition-related practices (Glanz et al., 1995; Richards & Mitchell, 2001). Five strategies were assessed: providing specific nutrition information, setting short-term goals, increasing patient motivation, recommending specific dietary changes and giving specific maintenance advice. GPs were most confident about being able to provide specific nutrition information (Glanz et al., 1995) and set short-term goals (Richards & Mitchell, 2001).

To implement these strategies, nutrition knowledge is needed, so GPs might search for nutrition information. Previous studies investigated the use of nutrition information sources by GPs (Kushner, 1995; Hiddink et al., 1997c). The Internet is a major new source of nutrition information.

The aims of this study were to identify the predominant nutrition communication styles of Dutch GPs, their strategies regarding nutrition communication and their information seeking behaviours. An additional aim is to provide a hypothetical model for nutrition communication style that can be tested in a planned future quantitative survey. This approach is analogous with our studies among consumers (Van Dillen et al., 2003).

METHODS

Focus groups

In focus groups, participants are brought together to engage in a discussion around a specific topic. The results are used to increase the understanding of that particular topic (Krueger, 1988). In our research nine focus groups were used to obtain GPs' perceptions of nutrition communication. Each session lasted for 2 h. An experienced moderator guided the discussion with the aid of a checklist. The checklist contained among other things questions about strategies regarding nutrition communication and information seeking behaviour about nutrition.

Study population

For the enrolment of respondents, we used the Dutch telephone book. For each focus group, a random group of 100-200 GPs was selected within a radius of 50 km around the city of investigation. These GPs received an announcement letter, in which they were invited to participate in a focus group with the topic 'health and lifestyle'. Subsequently, GPs were personally approached by telephone. The recruiters took account of recording GPs with distinguishing characteristics in the study population (males/females, solo/dual/group practice, city/country). In

total, 81 GPs participated. The majority of respondents were male (n=70). Fifty GPs worked in a solo practice, 23 GPs worked in a dual practice, and eight GPs worked in a group practice. Forty GPs worked in a city, while 41 GPs worked in the country.

Analysis

For this article, content analysis and simple counting were used. Discussions were video taped and transcribed verbatim. Data were analysed with the computer software program NUD*IST version 4. NUD*IST stands for Non-numerical Unstructured Data Indexing, Searching and Theorising (QSR, Melbourne). On the basis of a coding framework, the first author analysed the data. Different nutrition communication styles were identified and for each respondent the dominant nutrition communication style was derived from the data. In addition, data were quantified by counting. Furthermore, factors with a possible influence on the nutrition communication style were tracked down, and fitted into a hypothetical model for nutrition communication style. Finally, the transcripts were reread to form impressions of emerging themes.

Hypothetical model

On the basis of existing literature and additional factors derived from our data, we developed a hypothetical model for nutrition communication style, as shown in **Figure 6.1**. The model included psycho-social and socio-demographic variables. Psycho-social variables consisted of individual and environmental variables. Individual variables were divided into three categories, namely GPs' perceptions of lifestyle, GPs' perceptions of nutrition communication and GPs' perceptions of nutrition information. Environmental variables were divided into three categories, namely patient variables, office variables and health professionals' variables. **Table 6.1** gives an overview of all individual and environmental variables, including definitions. Furthermore, five socio-demographic variables were included, like gender, type of practice, number of practice years, practice size and residence.

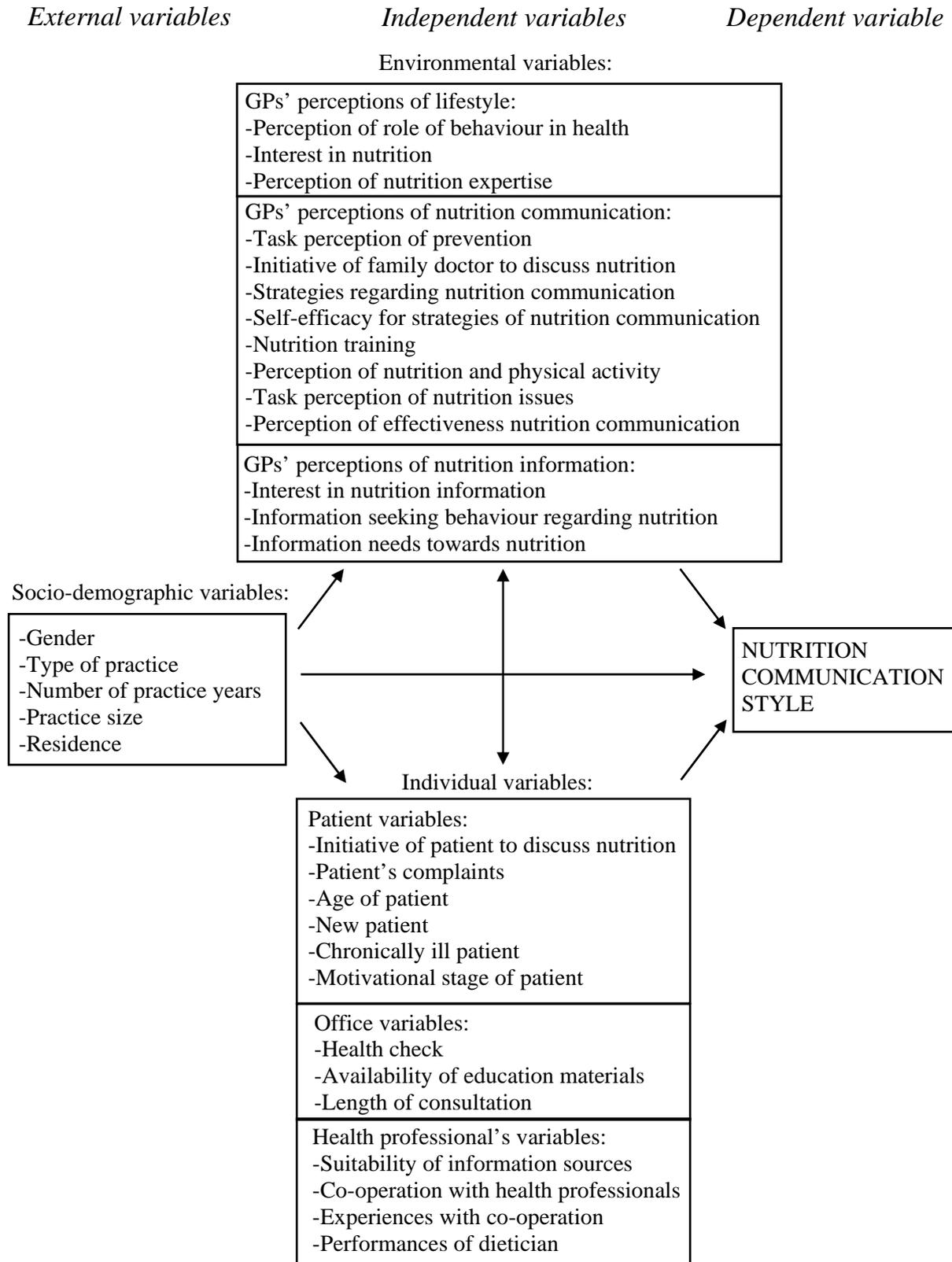


Figure 6.1 Hypothetical model for nutrition communication style

Table 6.1 Variables included in the hypothetical model for nutrition communication style

Variables	Definitions
<i>GPs' perceptions of lifestyle</i>	
Perception of the role of behaviour in health	Estimation of the contribution of behavioural factors (diet, smoking, alcohol, physical activity and personal hygiene) on patients' health state (Hiddink et al., 1997c)
Interest in nutrition	Involvement in the topic of nutrition (Hiddink et al., 1997c)
Perception of nutrition expertise	Estimation of own nutrition knowledge (Van Dillen et al., 2004)
<i>GPs' perceptions of nutrition communication</i>	
Task perception of prevention	Perceived relevance of primary, secondary and tertiary prevention (Hiddink et al., 1997c). The following definitions were used, according to the Dutch College of General Practitioners. Primary prevention means preventing diseases by removing risk factors, secondary prevention means searching for disease by unaware patient, followed by adequate treatment, tertiary prevention means preventing deterioration by occurred disease (Drenthen, 1999)
Initiative of GP to discuss nutrition	GP raises the subject of nutrition during consultation (Helman, 1997)
Strategies regarding nutrition communication	Referring to a dietician, providing nutrition advice, offering written education materials, offering patient information letters, referring to a course, applying a psychological approach, clarifying physical examinations (this study)
Self-efficacy for strategies regarding nutrition communication	Confidence in ability to provide specific nutrition information, set short-term goals, increase patient motivation, recommend specific dietary changes, give specific maintenance advice (Glanz et al., 1995; Richards & Mitchell, 2001)
Nutrition training	Attendance of classes in nutrition in medical school, during residency, through a fellowship or while in practice (Kushner, 1995)
Perception of nutrition and physical activity	Initiation of both dietary and exercise counselling (Anis et al., 2004)

Table 6.1 continued

Variables	Definitions
Task perception of nutrition issues	GP can handle nutrition problems themselves or put them aside to a dietician: recommend nutrition advice, take nutrition anamnesis, refer, motivate, diagnose problems, provide simple nutrition information, provide specific nutrition information, prescribe diets (Hiddink et al., 1997a)
Perception of effectiveness of nutrition communication	Effective components of nutrition communication are the following: theory-based, based on prior research, behaviourally focused, motivation, involvement, tailoring, new media, various psycho-social factors, food preparation, long-term maintenance (Contento et al., 2002)
<i>GPs' perceptions of nutrition information</i>	
Interest in nutrition information	Being receptive to new information about nutrition (Van Dillen et al., 2003)
Information seeking behaviour regarding nutrition	The way one obtains information in a passive or active way: books, dieticians, Internet, newspapers, postgraduate training courses, magazines, the Netherlands Nutrition Center, education offices of food sector, journals (Kushner, 1995; Hiddink et al., 1997c; Van Dillen et al., 2004)
Information needs towards nutrition	Needs for specific knowledge to obtain answers to important questions, like course in behavioural change, course in communication skills, Internet-site with nutrition information, minimal intervention strategy towards overweight, postgraduate training course about nutrition, patient information letters and standards, independent magazine about nutrition, practical tool concerning nutrition, schematic overview of nutrients (this study)
<i>Patient variables</i>	
Initiative of patient to discuss nutrition	Patient raises the subject of nutrition during consultation (Helman, 1997)
Patient's complaints	Medical conditions in which nutrition problems are most often mentioned are the following: diabetes mellitus, coronary heart disease, hypertension, hypercholesterolaemia, overweight/obesity, irritable bowel syndrome (Van Dusseldorp et al., 1988; Maiburg et al., 2004)

Age of patient	Nutrition counselling was more likely to occur during visits by patients who were older (Eaton et al., 2002; Anis et al., 2004)
New patient	Nutrition counselling was more likely to occur during visits by patients who were new (Anis et al., 2004)
Chronically ill patient	Nutrition counselling was more likely to occur during visits for chronic illness (Eaton et al., 2002)
Motivational stage of patient	Stages of behavioural change are the following: precontemplation (unaware), contemplation (aware), preparation (planning), action (changing), maintenance (sustaining)(Prochaska & Velicer, 1997)
<i>Office variables</i>	
Health check	Nutrition counselling was more likely to occur during visits for well care (Eaton et al., 2002)
Availability of education materials	Physicians in offices with brochures on dietary habits counselled patients on dietary habits more frequently (Anis et al., 2004)
Length of consultation	Nutrition counselling was more likely to occur during longer visits (Eaton et al., 2002)
<i>Health professional's variables</i>	
Suitability of information sources	Persons, organisations or media who are considered to be most reliable, expertised, clear and accessible to provide nutrition information: books, dieticians, Internet, newspapers, postgraduate training courses, magazines, the Netherlands Nutrition Center, education offices of food sector, journals (this study)
Co-operation with health professionals	Collaboration with health professionals in the past with respect to nutrition: practice assistant, nurse practitioner, diabetes nurse, medical specialist, dietician (this study)
Experiences with co-operation	Positive or negative practices of collaboration with health professionals: practice assistant, nurse practitioner, diabetes nurse, medical specialist, dietician (this study)
Performances of dietician	Positive or negative experiences of referring to a dietician: competent, psychological approach, spending more time, long waiting period, no show up, difficult reporting, high dropout rate, bad outcomes (this study)

RESULTS

Nutrition communication styles

Five nutrition communication styles were identified, namely (1) informational, (2) reference, (3) motivational, (4) confrontational, and (5) holistic style. Typical quotes from GPs with different nutrition communication styles are shown in **Table 6.2**.

Most GPs used the informational nutrition communication style. They said they discuss risk factors and the consequences of treatment options. GPs also mentioned using written education materials to support their nutrition communication. In addition, they offered simple information about nutrition. In case of diabetes, overweight and food allergy, most GPs were relying on an informational style.

Some GPs used a reference style. They automatically referred to another medical specialist for nutrition communication, especially for complex nutrition information. Several health professionals were mentioned, including dietitians, nurse practitioners, physician assistants, and internists. GPs also discussed that they felt their own nutrition knowledge was insufficient.

Next, some GPs with a motivational style were identified. They said they tried to assess the motivation of their patients and subsequently helping those who are motivated to change their nutrition behaviour. They also mentioned to fit the needs of the patients. Some GPs spoke about acting as a role model with respect to lifestyle.

Also, some GPs were characterised by a confrontational style. They felt it important to appoint complaints. They tried to relate nutrition to complaints and warn patients for running a risk.

Finally, a few GPs having a holistic style were identified. GPs mentioned that they made a risk profile during the first visit of each patient (including weight and nutrition behaviour) and they kept up his developments in the medical record. They often had an anthroposophical train of thought.

The first four styles were more often identified in male GPs and those working in a solo practice, while the last style was more often identified in female GPs and those working in a group practice.

Identification of nutrition communication styles

Table 6.2 Typical quotes from GPs with different nutrition communication styles

Type of style	Typical quotes
Informational style	“I tell the patient that he should eat less fat, but I leave it to him.” (GP11)
	“I never refer to the dietician, I just explain it myself.” (GP16)
	“I have got a lot of education materials, it is pleasant to give them home.” (GP10)
Reference style	“If there is a problem with weight or sugar, then I call in the dietician.” (GP61)
	“Several times you have to say: go to the dietician and let her analyse.” (GP70)
	“I refer them to Belgium for a stomach band, but they gradually understand that this is their only chance to survive.” (GP5)
Motivational style	“I try hard if people are willing, if they can extend their life with 10 years and if they are really motivated.” (GP2)
	“I look if they are vulnerable, then I talk for a long time. If they are not, then I mention it by the way, but not bore them.” (GP40)
	“Most important is to look if somebody is really motivated or not. If so, I try to exploit this.” (GP74)
Confrontational style	“I ask them how they feel that another fellow lives nicely from their build retirement.” (GP22)
	“I ask their weight and length and then I show them a table which turned out that they are inside a risk area.” (GP9)
	“With CHD I warned several times, but people turn out to be stubborn.” (GP4)
Holistic style	“I keep up how somebody lives, so I can repeat at a follow-up visit. I watch weight, so I can tell them on time to take care.” (GP43)
	“At first visit I discuss BMI and I show that they are at risk.” (GP8)
	“I ask them to keep up a diary, so I get a better view of their lifestyle.” (GP24)

Strategies regarding nutrition communication

Mean number of strategies regarding nutrition communication was 2.8. Seven GPs mentioned no strategy at all, 13 GPs mentioned one strategy, and while 19 GPs mentioned two strategies. So almost half of the GPs mentioned zero, one or two strategies.

The first five strategies regarding nutrition communication, in decreasing order, were (1) referring to a dietician, (2) providing advice according to dietary guidelines, (3) offering written education materials, (4) offering patient information letters, and (5) referring to a course. Furthermore, applying a psychological approach and clarifying physical examinations were also often mentioned. **Table 6.3** represents some examples from GPs with different strategies regarding nutrition communication.

Referring to a dietician was most frequently mentioned, particularly in cases where a comprehensive nutrition advice is needed, like with diabetes, overweight and food allergies. GPs viewed dieticians as competent and able to spend more time on these topics. However, some GPs discussed negative experiences with dieticians, like long waiting period, no show up, difficult reporting, high dropout rate, and bad outcomes.

Next, providing advice according to dietary guidelines was often mentioned. They expressed having some basic nutrition knowledge about carbohydrates, fats, and fibres. Eat less fat was the most cited advice, followed by maintaining a healthy weight, eating a lot of bread and potatoes, and not eating during the whole day. Only one respondent explicitly named the dietary guidelines.

Furthermore, some GPs said that they offered written education materials, especially about high cholesterol and diabetes. Leaflets from the Netherlands Nutrition Center and the Netherlands Heart Foundation were most often mentioned.

Table 6.3 Typical quotes from GPs with different strategies regarding nutrition communication

Type of strategy	Typical quotes
Refer to a dietician	<p>“Nutrition is a broad topic, so I delegate it to the dietician, who is skilled.” (GP27)</p> <p>“I feel the return rate of the dietician is low, after a year patients are too heavy again.” (GP44)</p>
Provide advice conform dietary guidelines	<p>“I provide general advice about nutrition: do not eat too much, eat a balanced diet.” (GP63)</p> <p>“You can explain roughly that people should eat less fat and sugar, and more carbohydrates.” (GP13)</p>
Offer written education materials	<p>“I hand out booklets about cholesterol and diabetes.” (GP76)</p> <p>“It is pleasant to give education materials. In case of questions patients can return.” (GP8)</p>
Offer patient information letters	<p>“I have got patient information letters in my computer, which I easily print out.” (GP15)</p> <p>“I copied the letters in three files, so I can grasp them quickly.” (GP36)</p>
Refer to a course	<p>“I offer fat people a card from the Weight Watchers.” (GP70)</p> <p>“I advise some patients to attend a fitness course.” (GP59)</p>

A few GPs mentioned that they offered patient information letters in case of diabetes, hypertension and high cholesterol. They said that those letters were integrated in the doctors information system. Other GPs mentioned that they made copies of the letters.

Finally, a few GPs referred their patients to a course. Mentioned courses were Weight Watchers, fitness courses, group education, and obesity clubs.

Relationships between styles and strategies

There were some relationships between nutrition communication styles and strategies. GPs with an informational style more often offered patient information letters and patient education materials. GPs with a reference style were more likely to refer to a dietician and to a course. GPs with a motivational style more often applied a psychological approach, while GPs with a holistic style more often clarified physical examinations. These results will be used in our planned future quantitative survey.

Information seeking behaviours about nutrition knowledge and skills

The first five nutrition information seeking behaviours about nutrition knowledge and skills, in decreasing order, were (1) reading about scientific studies, (2) reading specialist literature, (3) attending postgraduate training courses, (4) reading information from the education offices of the food sector and companies, and (5) reading information from the Netherlands Nutrition Center. **Table 6.4** shows some typical quotes for different information seeking behaviours.

Reading scientific studies was the information seeking behaviour most often mentioned. However, GPs did not mention specific journals. They heard somewhere about the results of a study, like in newspapers or at training.

Second, GPs cited to read specialist literature. Journals applied for GPs were mentioned like Patient Care, Modern Medicine, and the Dutch journal 'Huisarts en Wetenschap'.

Some GPs said that they attended postgraduate training courses about general diseases, which sometimes contained a nutrition component.

Several GPs discussed received information from education offices of the food sector and companies. However, they agreed that this information was not always objective.

Finally, a few GPs mentioned that they got information from the Netherlands Nutrition Center, namely web-site, CD-ROM and leaflets.

Table 6.4 Typical quotes of GPs with different information seeking behaviours about nutrition knowledge and skills

Information seeking behaviours	Typical quotes
Read about scientific studies	<p>“Nowadays, there are more publications about CHD risk factors, which absolutely changed my performance.” (GP30)</p> <p>“I need independent information, sometimes you come across studies from universities.” (GP13)</p>
Read specialist literature	<p>“I have read an article in ‘Huisarts en Wetenschap’ about observing obesity.” (GP41)</p> <p>“We read about evidence-based studies in our specialist literature.” (GP63)</p>
Attend postgraduate training courses	<p>“I attended postgraduate courses about diabetes and CHD with fascinating stories about prevention.” (GP21)</p> <p>“In a postgraduate course, they included the benefits of fish oil.” (GP22)</p>
Read information from education offices of the food sector and companies	<p>“Sometimes I get a magazine from the meat industry.” (GP26)</p> <p>“I am overwhelmed with leaflets from the industry and I try to get an helicopter view.” (GP79)</p>
Read information from the Netherlands Nutrition Center	<p>“I have a CD-ROM with nutrition topics from the Nutrition Center.” (GP1)</p> <p>“I search for information about nutrition on the web-site of the Nutrition Center.” (GP9)</p>

Development of a hypothetical model for nutrition communication style

Five nutrition communication styles were identified. Our approach was analogous with our studies among consumers (Van Dillen et al., 2003). On the basis of this qualitative study and existing literature, 32 factors were selected with a high probability of predicting one’s nutrition communication style. We included 14 individual variables, 13 environmental variables and five socio-demographic variables.

DISCUSSION

As far as we know, this is the first study, which explored specific nutrition communication styles. It was a qualitative study. Our data were based on self-report and might not reflect actual practice. Furthermore, the sample was not representative. Frequencies were determined based on GPs' expressions about the styles used rather than responding to a forced choice questionnaire. We obtained a lot of valuable information. We have selected five themes for discussion and we will elaborate on implications for research and practice.

Dominant role of informational nutrition communication style

In accordance with other studies about general communication styles among physicians, the majority used predominantly informational styles (Roter et al., 1997; Lawson, 2002). A recent study among Dutch GPs showed that they provided more information than 14 years ago (Van den Brink-Muinen et al., 2004). In our study, GPs mentioned that they mainly provide basic nutrition information. It seems like GPs have a firmly established, but restricted nutrition knowledge base derived from vocational training and dietary guidelines from the Nutrition Center, which they perceived sufficient for providing basic nutrition information. When difficult nutrition information is required, a reference style is put into action.

Although most GPs were characterised by an informational nutrition communication style, a substantial group of GPs was identified having a motivational style. They said they tried to persuade patients to healthy eating patterns, while taking into account their readiness to change. This implies that GPs might implicitly apply the Stages of Change Model (Prochaska & Velicer, 1997). The Stages of Change Model contains five stages: (1) precontemplation (not yet considering change), (2) contemplation (considering change), (3) preparation (planning change), (4) action (actively changing), and (5) maintenance (sustaining change). The model is viewed as a valuable model for changing behaviour, especially in primary care. It enables the GP to obtain important information for behaviour change in a short period of time. Starting with brief and simple advice makes sense, because some patients will indeed change their behaviour at the directive of their physician (Zimmerman et al., 2000). A recent review showed that there were five studies, which paint a positive picture for the effects of stage-based interventions on dietary behaviour, or more specifically on fat intake (Van Sluijs et al., 2004b). The motivational style was more important than we thought until now.

GPs' view on dieticians: competitors or colleagues

Referring to a dietician was the strategy regarding nutrition communication most often mentioned. In accordance with another study (Nicholas et al., 2003), the primary influence of the GP's decision to refer to a dietician was a patient presenting with complicated nutrition requirements. This implies that GPs might not view their own nutrition knowledge sufficient.

Many GPs expressed positive experiences with free-established dieticians (dieticians who run their own practice), who lose themselves in the individual patient and provide tailored advice, which is more feasible. A few GPs expressed negative experiences with home care dieticians (dieticians who are employed at a domiciliary care agency), who provide standard advice. Standard advice is often not effective in obesity prevention and treatment. Referred patients with complex diseases, like obesity, often have low motivation, which might trigger bad outcomes. Therefore, it is likely that expressed negative experiences with home care dieticians rested on patient outcomes.

Generally, most GPs viewed dieticians as experts. In this case, dieticians were viewed as colleagues, as allied health professionals. A few GPs felt threatened through the expertise of dieticians, because their self-image might be harmed. These GPs viewed dieticians as competitors in stead of colleagues in the field. Therefore, good communication is essential, because the majority of the bottlenecks in the tuning of nutrition education between GPs and dieticians concerned bad communication. Examples were little consultation, unfamiliarity with the procedures of dieticians, obscurity of consulting hours of dieticians and not being personally acquainted with dieticians (Van den Hogen et al., 1996).

Dismissal of maintenance advice

Our results about strategies regarding nutrition communication were compared with the arrangement of Glanz et al. (1995). Offering written education materials and offering patient information letters are comparable with providing specific nutrition information. Providing advice according to dietary guidelines resembles recommending specific dietary changes. However, the arrangement of Glanz et al makes it impossible to categorise referring, so our rearrangement might be valuable.

In agreement with two studies (Glanz et al., 1995; Richards & Mitchell, 2001), giving specific maintenance advice was hardly mentioned. A possible explanation is that this strategy requires high efforts to keep a patient in the last phase of the Stages of Change Model and to prevent relapse to former undesired behaviour (Prochaska & Velicer, 1997). On the other hand, other strategies (such as referring to a dietician and offering written education materials) were more often mentioned, while these strategies were easier to accomplish in their busy practice.

We assume that GPs did not use specific relapse prevention strategies, but only superficially check progress. In addition, they often postponed the discussion of weight problems to a follow-up visit. Continuity of care enables GPs to break down advice over successive consultations (Van Weel, 2003).

Scanning information about nutrition

In a study among GPs, the primary sources of current nutrition information were medical journals (69%) and dieticians (58%) (Kushner, 1995). In another study, dieticians (72%) and the literature (34%) were most often mentioned (Hiddink et al., 1997c). Our respondents did not mention medical journals as an important nutrition information source. However, GPs mentioned scientific studies, but they often did not specify where they read it, although they sometimes mentioned newspapers. As opposed to other studies (Kushner, 1995; Hiddink et al., 1997c), dieticians were not cited as an important nutrition information source, although referrals to dieticians were made. It seems like our respondents preferred to read nutrition information instead of asking other health professionals. We tend to conclude that GPs are quite passive in seeking information about nutrition.

In accordance with our consumer study (Van Dillen et al., 2004), GPs are as well not actively involved in seeking information about nutrition. In a sense, GPs actually are consumers as well. Through scanning they tried to manage the huge piles of information which showed up their desks. In this process, independent and reliable information from universities and education offices was highly appreciated.

Dealing with patients' expectations about the expert physician

Our consumer studies showed that consumers have high expectations regarding nutrition communication through GPs (Van Dillen et al., 2003/2004). GPs were perceived as the most reliable and accessible nutrition information source, and after the dietician perceived as possessing the most expertise (De Almeida et al., 1997; Hiddink et al., 1997c; Van Dillen et al., 2003/2004).

This study among GPs showed that they believed that patients expect a lot from them and patients perceived the GP as an expert on every topic, including nutrition. However, GPs also felt that they have rather low nutrition knowledge themselves. However, GPs hold a dualistic position regarding their nutrition knowledge. They believed they had a restricted nutrition knowledge base, being aware of the functions and recommended amounts of different nutrients. However, they considered this type of knowledge as sufficient for dealing with the most common health problems. GPs should manage this dilemma by rethinking their role as an expert, because GPs are in fact generalists. New research could explore how GPs might manage this dilemma.

CONCLUSIONS

Five nutrition communication styles were identified, namely an informational, reference, motivational, confrontational and holistic style. The informational style of nutrition communication was dominant among Dutch GPs. A hypothetical model for nutrition communication style was developed, encompassing socio-demographic variables (like gender, type of practice, number of practice years, practice size and residence), individual (including GPs' perceptions of lifestyle, GP's perceptions of nutrition communication and GPs' perceptions of nutrition information) and environmental variables (including patient variables, office variables and health professional's variables). GPs hardly provided maintenance advice for nutrition behaviour. Many GPs referred patients to dietitians, who were viewed as colleagues (allied health professionals). GPs try to get basic information about nutrition by scanning the literature they get. They seldom are actively involved in seeking specific nutrition information. Finally, GPs had the impression that patients expect expert nutrition communication from them, while GPs perceived their own nutrition knowledge as restricted.

Practice implications

The above-mentioned results have important implications regarding effective nutrition communication through GPs with respect to:

a) research:

Clarify differences in nutrition communication styles by gender or type of practice: it remained unclear whether gender and type of practice exerted influence on nutrition communication styles. Since this is a qualitative study, it is not possible to make statements. Therefore, a quantitative study is needed to test our hypothetical model.

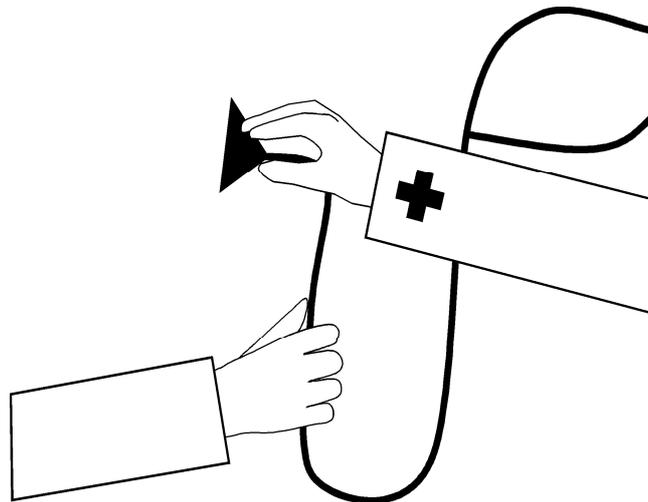
b) practice:

Raise self-efficacy of GPs regarding nutrition communication: GPs can rely on their firmly established knowledge base and offer simple nutrition information. Involving nutrition as a topic in vocational or postgraduate training can raise self-efficacy.

Build good collaboration with dietitians: in case of complex diseases, GPs and dietitians should work together towards the same goal. It is essential that they have a clear view of each other's fields.

CHAPTER 7

NUTRITION COMMUNICATION STYLES OF FAMILY DOCTORS: RESULTS OF QUANTITATIVE RESEARCH



Published as:

Van Dillen SME, Hiddink GJ, Koelen MA, Van Woerkum CMJ. Nutrition communication styles of family doctors: results of quantitative research. *Eur J Clin Nutr* 2005; 59: S47-S56.

ABSTRACT

Objective: To assess nutrition communication styles of Dutch family doctors and in particular to assess its psychosocial and socio-demographic correlates.

Design: A cross-sectional study in which a representative sample of 600 Dutch family doctors completed a questionnaire.

Setting: The survey was conducted in October and November 2004 in the Netherlands.

Subjects: 267 family doctors completed the questionnaire (response rate 45%).

Methods: Principal component factor analyses with varimax rotation were performed to construct factors. Cronbach's alpha was used as an index of reliability. Our hypothetical model for nutrition communication style was tested using multiple regression analysis (MRA), combining the forward and backward procedure under the condition of the same results.

Results: Many family doctors felt at ease with a motivational nutrition communication style. The main predictor for motivational nutrition communication style was task perception of prevention (26%). Some individual and environmental correlates had an additional influence (explained variance 49%). Other styles showed explained variances up to 57%. The motivational style was the best predictor for actual nutrition communication behaviour (35%), while the confrontational style was the best predictor for actual nutrition communication behaviour towards overweight (34%).

Conclusions: In contemporary busy practice, family doctors seem to rely on their predominant nutrition communication style to deal with standard situations efficiently: for the majority, this proved to be the motivational nutrition communication style. Moreover, family doctors used a combination of styles. This study suggests that family doctors behave like chameleons, by adapting their style to the specific circumstances, like context, time and patient. If family doctors communicate about nutrition in general, they select any of the five nutrition communication styles. If they communicate about overweight, they pick either the confrontational or motivational style.

Sponsorship: Dutch Dairy Association.

Keywords: communication style; family doctors; nutrition communication; nutrition education, the Netherlands; health professionals

Acknowledgements: We would like to thank all family doctors for their participation. We are grateful to NIVEL (Netherlands Institute for Health Services Research), who took a sample of family doctors from their database for our study. We also thank market research office GfK (Linda Ruijten, Gwyneth Leermakers) for their help in the organisation of this study.

INTRODUCTION

In medical consultations, good communication is of utmost importance. Communication style is a relatively new concept in this field. A communication style serves a pragmatic function in that it represents a set of responses that are readily available and appropriate for communicating across various situations (Street, 2002). When doctors used an informational communication style, patients expressed more overall satisfaction (Roter et al., 1997). Affiliative communication styles were related positively to patients' satisfaction, whereas dominant communication styles had a negative relationship with satisfaction (Klein Buller & Buller, 1987). Research on doctor-patient communication reveals that the majority of doctors used only one communication style in most of their consultations (Roter et al., 1997). This leaves the question whether doctors used only one communication style or a combination of communication styles.

Although several studies assessed performances of family doctors according to current standards, relatively few assessed what they actually do in their busy practice. In our study, we try to understand which communication styles family doctors used, if they dealt with the subject of nutrition. A recent study showed that family doctors expressed difficulties with carrying out prevention and health promotion activities (Brotons et al., 2005). Therefore, knowledge of family doctor's nutrition communication style is important, because this offers the opportunity of giving advice to a family doctor, dependent on his style. As far as we know, specific nutrition communication styles were not studied before. We therefore conducted a combination of qualitative and quantitative studies among Dutch family doctors.

In our qualitative study, five nutrition communication styles were identified, namely an informational, reference, motivational, confrontational and holistic style (Van Dillen et al., 2005b). An informational style means providing information about nutrition and health. A reference style stands for calling on other health professionals to deal with nutrition problems. A motivational style means guidance in dietary change. A confrontational style stands for warning about nutrition problems related to a health complaint and a holistic style stands for involving several aspects as being part of living circumstances. Our qualitative study showed that most family doctors used an informational nutrition communication style, but combinations with other styles were also possible. We suspected that the role of the motivational nutrition communication appeared on the scene.

The aim of the quantitative study was to assess nutrition communication styles and combinations, and in particular to assess their psycho-social and socio-demographic correlates. In addition, the relationships between different nutrition communication styles and actual nutrition

communication behaviour were measured. At the end of this article, we will give recommendations to extend communication skills.

METHODS

Subjects

Our study population consisted of Dutch family doctors, in practice for 5 to 25y. We asked NIVEL (Netherlands Institute for Health Services Research) to take a random sample of 600 family doctors from their database. 267 family doctors completed the questionnaire (response rate 45%).

In addition, 27 family doctors completed a non-response questionnaire (5%). Representativeness analysis revealed that there were no significant differences in socio-demographic variables between respondents (n=267) and the population of family doctors, in practice for 5 to 25y (n=4003). There were also no significant differences between respondents (n=267) and respondents of the non-response questionnaire (n=27) in socio-demographic variables or interest in nutrition, perception of nutrition expertise, task perception of prevention and frequency of nutrition communication. Therefore, we decided not to compose a weight factor.

Of the 267 respondents, 198 were male (74%) and 69 were female (26%). One hundred-and-six family doctors were working in a solo practice (40%), 100 in a dual practice (37%) and 61 in a group practice (23%). They had been in practice for an average of 17 y. Mean practice size was 2461 patients. Practices were located in highly urban (16%), urban (25%), moderately urban (22%), little urban (20%) and not urban areas (17%).

Procedure

In October 2004, 600 family doctors received a personal letter, in which they were asked to participate by a questionnaire in a study about nutrition communication. Two weeks after the first letter and questionnaire, personal reminders were sent to family doctors, who did not return the questionnaire. After four weeks, a second reminder was sent. Finally, after six weeks a third reminder and a non-response questionnaire were sent. The time to complete the questionnaire was about 30 minutes. Each respondent received a gift coupon and an overview of the main results of the study.

Questionnaire

First, a qualitative study was conducted to obtain family doctors' perceptions of nutrition communication (Van Dillen et al., 2005b). On the basis of focus group interviews with 81 family doctors (nine sessions), we identified five nutrition communication styles, namely an informational, reference, motivational, confrontational and holistic style.

The dependent variable *nutrition communication style* was assessed with forty self-composed propositions using a five-point Likert scale (strongly disagree - strongly agree) in order to construct separate scales for each of the five styles.

On the basis of existing literature and additional factors derived from our qualitative study, we developed a hypothetical model for nutrition communication style, containing psycho-social and socio-demographic correlates. Definitions of all variables included in the hypothetical model were described in another article (Van Dillen et al., 2005b). Psychosocial correlates were divided into individual and environmental variables.

Several *individual variables* were measured, including family doctors' perceptions of lifestyle (like perception of the role of behaviour in health and interest in nutrition), family doctors' perceptions of nutrition communication (like task perception of prevention and perception of effectiveness of nutrition communication) and family doctors' perceptions of nutrition information (like information seeking behaviour regarding nutrition and information needs towards nutrition). **Table 7.1** provides an overview of the number of items, Cronbach's α 's and factor loadings for all individual variables.

Table 7.1 Individual variables used in the multiple regression analysis to construct regression models for nutrition communication styles in tables 7.3-7.7

Description	I*	α	Loadings
Family doctors' perceptions of lifestyle			
Perception of role of behaviour in health (Hiddink et al., 1997b)	6	0.75	0.60-0.77
Perception of role of heredity in health (idem)	1	-	-
Interest in nutrition (Hiddink et al., 1997b)	1	-	-
Perception of nutrition expertise (Van Dillen et al., 2004)	1	-	-
Family doctors' perceptions of nutrition communication			
Initiative of family doctor to discuss nutrition (Helman, 1997)	1	-	-
Task perception of prevention (Hiddink et al., 1997b)	3	0.63	0.68-0.90
Referring to dietician as strategy (Van Dillen et al., 2005b)	1	-	-

Table 7.1 Continued

Description	I*	α	Loadings
Providing nutrition advice as strategy (idem)	1	-	-
Offering written education materials as strategy (idem)	1	-	-
Offering patient information letters as strategy (idem)	1	-	-
Referring to a course as strategy (idem)	1	-	-
Applying a psychological approach as strategy (idem)	1	-	-
Clarifying physical examinations as strategy (idem)	1	-	-
Self-efficacy for strategies regarding nutrition communication (Glanz et al., 1995; Richards & Mitchell, 2001)	5	0.83	0.66-0.87
Nutrition training (Kushner, 1995)	1	-	-
Perception of nutrition and physical activity (Anis et al., 2004)	1	-	-
Task perception of nutrition issues (Hiddink et al., 1997b)	6	0.53	0.37-0.70
Referring as task perception (idem)	1	-	-
Prescribing diet as task perception (idem)	1	-	-
Perception of effectiveness of nutrition communication (Contento et al., 2002)	10	0.80	0.47-0.72
Family doctors' perceptions of nutrition information			
Interest in nutrition information (Van Dillen et al, 2004)	1	-	-
Information seeking behaviour regarding nutrition (Van Dillen et al., 2004/2005b; Kushner, 1995; Hiddink et al., 1997b)	9	0.85	0.51-0.80
Seeking nutrition information of dietician (idem)	1	-	-
Information needs towards nutrition means (Van Dillen et al., 2005b)	8	0.47	0.24-0.64
Information need towards NHG-standards and patient information letters (idem)	1	-	-

I* Number of items constituting a factor (see methods)

Alpha: Cronbach's alpha, as an index of reliability of the factor (see methods)

Loadings: when a factor is constituted of at least two items, the level of factor loadings gives an idea to what extent an item is important for the expression of that factor (for principal component factor analysis with varimax rotation; see methods)

Also, a number of *environmental variables* were measured, including patient variables (like initiative of the patient to discuss nutrition and the patient's complaint), office variables (like availability of education materials and length of consultation), and health professional's variables (suitability of information sources and co-operation with health professionals). **Table 7.2** provides an overview of the number of items, Cronbach's α 's and factor loadings for all environmental variables.

Nutrition communication styles of family doctors

Table 7.2 Environmental variables used in the multiple regression analysis to construct regression models for nutrition communication styles in tables 7.3-7.7

Description	I*	α	Loadings
Patient variables			
Initiative of patient to discuss nutrition (Helman, 1997)	1	-	-
Patient's complaint diabetes mellitus (Van Dusseldorp et al., 1988; Maiburg et al., 2004)	1	-	-
Patient's complaint coronary heart disease (CHD)(idem)	1	-	-
Patient's complaint hypercholesterolemia (idem)	1	-	-
Patient's complaint hypertension (idem)	1	-	-
Patient's complaint overweight/obesity (idem)	1	-	-
Patient's complaint normal weight	1	-	-
Patient's complaint irritable bowel syndrome (idem)	1	-	-
Patient's complaint stress	1	-	-
Patient's complaint fatigue	1	-	-
Patient's complaint pregnancy	1	-	-
Age of patient (Eaton et al., 2002; Anis et al., 2004)	1	-	-
New patient (Anis et al., 2004)	1	-	-
Chronically ill patient (Eaton et al., 2002)	1	-	-
Patients in further motivational stages (Van Dillen et al., 2005b)	3	0.65	0.72-0.82
Patient in precontemplation stage (idem)	1	-	-
Patient in contemplation stage (idem)	1	-	-
Office variables			
Health check (Eaton et al., 2002)	1	-	-
Availability of education materials (Anis et al., 2004)	1	-	-
Length of consultation (Eaton et al., 2002)	1	-	-
Health professional's variables			
(Reference) books as suitable source (Van Dillen et al., 2004)	1	-	-
Dietician as suitable source (idem)	1	-	-
Internet as suitable source (idem)	1	-	-
Newspapers as suitable source (idem)	1	-	-
Post-graduate training courses as suitable source (idem)	1	-	-
Magazines as suitable source (idem)	1	-	-
Specialist literature as suitable source (idem)	1	-	-
The Netherlands Nutrition Center as suitable source (idem)	1	-	-

Table 7.2 Continued

Description	I*	α	Loadings
Education offices of the food sector as suitable source (idem)	1	-	-
Scientific journals as suitable source (idem)	1	-	-
Co-operation with health professionals (Van Dillen et al., 2005b)	4	0.47	0.44-0.77
Co-operation with nurse practitioner (idem)	1	-	-
Experiences with co-operation (Van Dillen et al., 2005b)	3	0.38	0.50-0.76
Experience with nurse practitioner (idem)	1	-	-
Experience with dietician (idem)	1	-	-
Performances of dietician (Van Dillen et al, 2005b)	6	0.71	0.47-0.79
Waiting list as performance of dietician (idem)	1	-	-
Show up rates as performances of dietician (idem)	1	-	-

I* Number of items constituting a factor (see methods)

Alpha: Cronbach's alpha, as an index of reliability of the factor (see methods)

Loadings: when a factor is constituted of at least two items, the level of factor loadings gives an idea to what extent an item is important for the expression of that factor (for principal component factor analysis with varimax rotation; see methods)

All psycho-social correlates were scored on a five-point Likert-scale, except for information needs towards nutrition (yes-no categories), perception of nutrition expertise, initiative of nutrition communication, suitability of information sources, co-operation with health professionals (three-point scale), interest in nutrition (information) (four-point scale), and perception of the role of behaviour in health and self-efficacy for strategies regarding nutrition communication (10-point scale).

Socio-demographic correlates recorded were gender, type of practice, number of practice years, practice size and residence.

Two behavioural measures were included. First, *actual nutrition communication behaviour* of family doctors was operationalised with seven items ($\alpha = 0.68$). *Actual nutrition communication behaviour towards overweight* of family doctors was operationalised with five items ($\alpha = 0.68$) (Hiddink et al., 1997b). Respondents were also asked to estimate the percentage of consultations in which they discussed nutrition in the past month (*frequency of nutrition communication*) and how many minutes they spent on discussing nutrition (*duration of nutrition communication*).

Analysis

Descriptive statistics were compared. Wilcoxon Rank Order Tests was used to compare the numbers of nutrition communication styles of family doctors. Principal component factor-analyses with varimax rotation were performed to construct scales. Scales were verified with reliability analysis. Alpha's greater than 0.55 were considered acceptable. If not, separate items were taken along in the analysis (Table 7.1; Table 7.2). χ^2 analysis was used for associations between nutrition communication styles and socio-demographic correlates. Our hypothetical model for nutrition communication style was tested using multiple linear regression, combining forward and backward procedure under the condition of same results. The Bonferroni correction was used in this procedure (Hommel, 1988). In the forward procedure of the multiple regression analysis (MRA), in every step the next best determinant is taken in the equation, until the p-value is exceeded. In the backward procedure, in every step the weakest determinant is taken out the equation, until the highest number of determinants is in the equation, and still the p-value is less than 0.05. The outcome will only be accepted as valid when forward and backward procedure deliver exactly the same result.

Finally, the relationships between nutrition communication styles and actual nutrition communication behaviour of family doctors were analysed with Pearson correlation coefficients and multiple linear regression. Data were analysed with the computer software program SPSS 10.5. P-values less than 0.05 were considered significant.

RESULTS

Nutrition in general practice

In the past month, nutrition was discussed in 14% of the consultations, which implies that nutrition is a daily topic. Mean duration of nutrition communication was five minutes. Fifty-six percent of the family doctors mentioned that they generally took the initiative themselves to communicate about nutrition, 4% mentioned that the initiative was mainly taken by the patient, while 40% said that initiative was equally divided between family doctors and patients. Nutrition was most often discussed in the following health problems: overweight/obesity (73% always), diabetes mellitus (72%), hypercholesterolaemia (68%), irritable bowel syndrome (45%) and coronary heart disease (CHD)(44%).

Nutrition communication styles

Family doctors used a combination of nutrition communication styles. To compare different styles, we composed a sum score for each style on the basis of eight items (range 8-40). Mean score was the highest for the motivational nutrition communication style (29.2; SD 3.3), followed by the confrontational (27.5; SD 4.2), reference (26.6; SD 3.8), informational (26.0; SD 3.1) and holistic nutrition communication style (23.4; SD 3.8). Many family doctors felt at ease with a motivational nutrition communication style.

Wilcoxon Rank Order Tests revealed a significant difference between the motivational and confrontational nutrition communication style ($Z=-6.4$, $p=0.00$). Family doctors also scored higher on the motivational nutrition communication style than reference ($Z=-7.4$, $p=0.00$), informational ($Z=-11.1$, $p=0.00$) and holistic style ($Z=-13.7$, $p=0.00$). Preference for the motivational style came back in this hierarchy.

Relationships between the motivational nutrition communication style and other styles were positive ($r>0.30$), except for reference style ($r=-0.16$). This means that family doctors combined multiple styles, but the reference style did not match with the other styles.

In all, 111 family doctors (42%) had the highest score on the motivational nutrition communication style. For the confrontational and reference style, this proved to be 24%. Nine percent had the informational style at first rank, while 2% had the highest mean score on the holistic style. From the family doctors with the highest score on the motivational nutrition communication style ($n=111$), 37 (14%) had the second highest score on confrontational style. The groups were too small to establish profiles.

For further in-depth analyses, we re-scaled the nutrition communication styles. Factor analysis revealed five factors: motivational nutrition communication style (four items; $\alpha = 0.69$), confrontational nutrition communication style (seven items; $\alpha = 0.75$), reference nutrition communication style (four items; $\alpha = 0.75$), informational nutrition communication style (three items; $\alpha = 0.75$) and holistic nutrition communication style (six items; $\alpha = 0.72$).

Differences by gender

Female family doctors had a higher score on the holistic ($\chi^2=2.3$, $df=1$, $p=0.13$), motivational style ($\chi^2=1.5$, $df=1$, $p=0.21$) and informational nutrition communication style ($\chi^2=1.4$, $df=1$, $p=0.23$) than their male colleagues. Male family doctors had a higher score on the confrontational ($\chi^2=1.0$, $df=1$, $p=0.31$) and reference style ($\chi^2=0.8$, $df=1$, $p=0.37$) than female family doctors, but these gender differences were not significant.

Differences by type of practice

Type of practice was also not significant. Family doctors working in a solo practice did not differ in their use of a reference ($\chi^2=1.3$, $df=2$, $p=0.52$) or confrontational style ($\chi^2=0.3$, $df=2$, $p=0.84$) compared with those in dual or group practice. Family doctors working in a dual practice more often had a motivational ($\chi^2=2.2$, $df=2$, $p=0.33$) or informational style ($\chi^2=1.9$, $df=2$, $p=0.39$) than other groups. Moreover, family doctors working in a group practice had higher scores on the holistic style ($\chi^2=1.2$, $df=2$, $p=0.56$).

Regression analysis

Our hypothetical model for nutrition communication style (Van Dillen et al., 2005b) was tested with multiple linear regression. Main predictors for motivational nutrition communication style were task perception of prevention (26.2%), information seeking behaviour regarding nutrition (8.9%), patient’s complaint (hypertension) (5.2%), interest in nutrition (3.0%), task perception of nutrition issues (2.7%), perception of nutrition and physical activity (1.8%) and initiative of family doctor to discuss nutrition (1.4%). Socio-demographic correlates were no predictors, so total explained variance was 49.2% (Table 7.3). The model is shown in Figure 7.1.

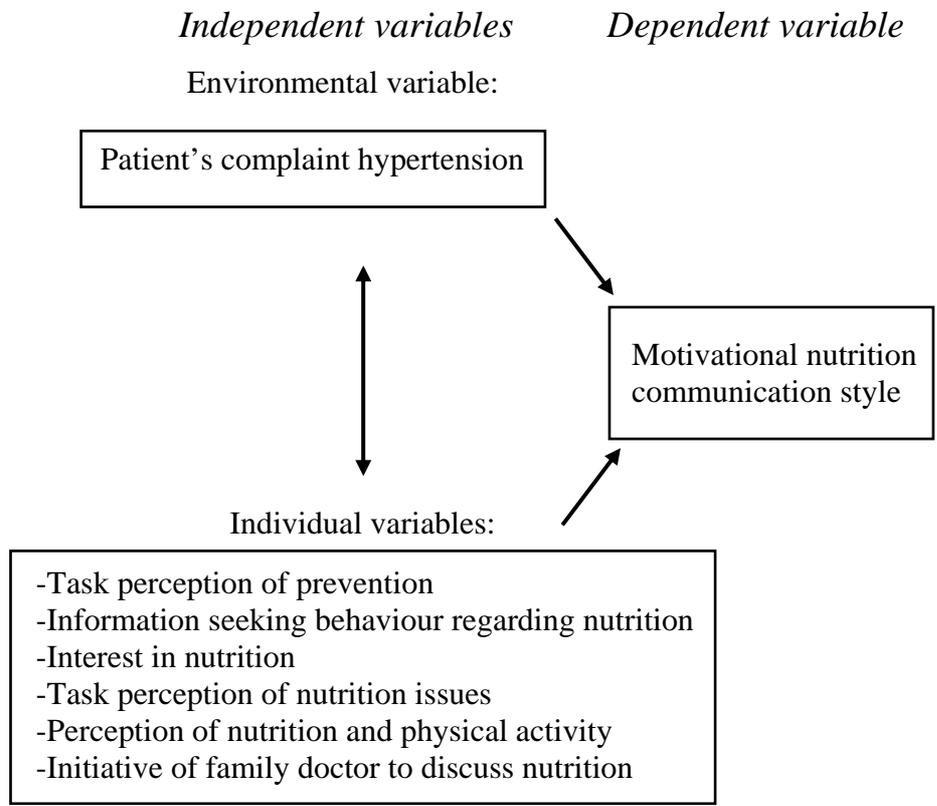


Figure 7.1 Model for motivational nutrition communication style (n=267)

Chapter 7

The best predictor of the confrontational style was also task perception of prevention. **Table 7.4** shows the regression model for the confrontational style (explained variance 30.3%). The variance in reference style was explained by 54.7% of individual and environmental variables with task perception of nutrition issues as the main predictor (**Table 7.5**). **Table 7.6** shows that the regression model for the informational style explained 56.7% of the total variance and offering patient information letters as strategy added most. Finally, a new patient best predicted the holistic style and the model explained 43.3% of the total variance (**Table 7.7**).

Table 7.3 Regression model for motivational nutrition communication style (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Task perception of prevention	0.511	0.262	0.262	9.7	0.51	0.000	0.51
2	Information seeking behaviour regarding nutrition	0.592	0.351	0.089	6.0	0.32	0.000	0.46
3	Patient's complaint hypertension	0.635	0.403	0.052	4.8	0.24	0.000	0.40
4	Interest in nutrition	0.658	0.433	0.030	3.7	0.18	0.000	0.36
5	Task perception of nutrition issues	0.678	0.459	0.027	3.6	0.17	0.000	0.34
6	Perception of nutrition and physical activity	0.691	0.478	0.018	3.0	0.14	0.003	0.27
7	Initiative of family doctor to discuss nutrition	0.701	0.492	0.014	2.7	0.12	0.007	0.28

Table 7.4 Regression model for confrontational nutrition communication style (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Task perception of prevention	0.408	0.166	0.166	7.3	0.41	0.000	0.41
2	Perception of the role of behaviour in health	0.477	0.228	0.061	4.6	0.26	0.000	0.35
3	Perception of effectiveness of nutrition communication	0.507	0.257	0.029	3.2	0.18	0.002	0.31
4	Patient's complaint CHD	0.532	0.283	0.027	3.1	0.17	0.002	0.29
5	Length of consultation	0.551	0.303	0.020	2.7	0.15	0.007	0.31

Nutrition communication styles of family doctors

Table 7.5 Regression model for reference nutrition communication style (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Task perception of nutrition issues	0.555	0.308	0.308	-10.9	-0.56	0.000	-0.56
2	Nutrition training	0.646	0.418	0.110	-7.1	-0.35	0.000	-0.49
3	Applying a psychological approach as strategy	0.670	0.450	0.032	-3.9	-0.19	0.000	-0.34
4	Referring to dietician as strategy	0.691	0.478	0.028	3.8	0.17	0.000	0.25
5	Information seeking behaviour regarding nutrition	0.704	0.496	0.018	-3.1	-0.16	0.002	-0.42
6	Perception of the role of behaviour in health	0.718	0.515	0.019	3.2	0.15	0.002	0.06
7	Perception of nutrition expertise	0.730	0.532	0.017	-3.1	-0.16	0.002	-0.46
8	(Reference) books as suitable source	0.740	0.547	0.015	-2.9	-0.12	0.004	-0.08

Table 7.6 Regression model for informational nutrition communication style (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	R
1	Offering patient information letters as strategy	0.669	0.448	0.448	14.7	0.67	0.000	0.67
2	Perception of effectiveness of nutrition communication	0.701	0.491	0.043	4.7	0.21	0.000	0.25
3	Initiative of family doctor to discuss nutrition	0.721	0.520	0.029	4.0	0.17	0.000	0.23
4	New patient	0.733	0.538	0.018	3.2	0.14	0.002	0.21
5	Seeking nutrition information of dietician	0.744	0.554	0.016	3.1	0.13	0.003	0.19
6	Offering written education materials as strategy	0.753	0.567	0.013	2.8	0.13	0.006	0.43

Table 7.7 Regression model for holistic nutrition communication style (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	R
1	New patient	0.528	0.279	0.279	10.1	0.53	0.000	0.21
2	Providing nutrition advice as strategy	0.594	0.353	0.074	5.5	0.28	0.000	0.37
3	Perception of nutrition and physical activity	0.623	0.388	0.035	3.9	0.19	0.000	0.29
4	Chronically ill patient	0.644	0.414	0.026	3.4	0.18	0.001	0.40
5	Perception of nutrition expertise	0.658	0.433	0.019	3.0	0.15	0.003	0.35

Relationship with actual nutrition communication behaviours

The highest correlation was found between motivational nutrition communication style and actual nutrition communication behaviour ($r = 0.59$). Relationships of actual nutrition communication behaviours with all nutrition communication styles were positive, except for the reference nutrition communication style (**Table 7.8; Table 7.9**).

The variance in actual nutrition communication behaviour of family doctors was best explained by the motivational nutrition communication style (34.5%). The five styles together explained 48.0% of the total variance (Table 7.8). Additional analysis, including nutrition communication styles, individual and environmental variables, confirmed that nutrition communication styles were the main predictors.

Table 7.9 shows that actual nutrition communication behaviour towards overweight of family doctors was best predicted by the confrontational style (34.4%), and the motivational style added 5.9% (explained variance 40.3%). Additional analysis, including nutrition communication styles, individual and environmental variables, showed that individual and environmental variables added little to actual nutrition communication behaviour of family doctors towards overweight patients.

Nutrition communication styles of family doctors

Table 7.8 Regression model for actual nutrition communication behaviour of family doctors (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Motivational style	0.587	0.345	0.345	11.8	0.59	0.000	0.59
2	Holistic style	0.628	0.395	0.050	4.7	0.25	0.000	0.46
3	Confrontational style	0.657	0.431	0.036	4.1	0.22	0.000	0.48
4	Reference style	0.682	0.465	0.034	-4.1	-0.20	0.000	-0.39
5	Informational style	0.693	0.480	0.015	2.7	0.13	0.007	0.29

Table 7.9 Regression model for actual nutrition communication behaviour towards overweight of family doctors (n=267)

Step	Variable	R	R ²	R ² change	T	B	P	r
1	Confrontational style	0.587	0.344	0.344	11.8	0.59	0.000	0.59
2	Motivational style	0.635	0.403	0.059	5.1	0.28	0.000	0.50

DISCUSSION

To our knowledge, this is the first study about nutrition communication styles. We conclude that many family doctors felt at ease with a motivational nutrition communication style. The main predictor for motivational nutrition communication style was task perception of prevention (26.2%). Some individual and environmental correlates had an additional influence, but socio-demographic correlates did not (explained variance 49.2%). Other styles showed explained variances up to 56.7%. Our results indicated that individual variables were more prominent than environmental variables. For actual nutrition communication behaviour of family doctors, the motivational style was the best predictor (34.5%), while the confrontational style was the best predictor for actual nutrition communication behaviour towards overweight (34.4%). This implies that if family doctors communicate about nutrition in general, they could use any of the five styles, but the majority would choose the motivational style. If the subject changes to communication about overweight, family doctors pick either the confrontational or the motivational style. In contrast to Roter et al. (1997), our study suggested that family doctors combined multiple communication styles. Moreover, the reference nutrition communication style did not match with the other styles.

Daily topic in general practice

Our results about the frequency of nutrition communication were in agreement with other studies (Van Dusseldorp et al., 1988; Helman, 1997; Richards & Mitchell, 2001). Overweight/obesity, diabetes mellitus and hypercholesterolaemia were the most important nutrition-related topics in general practice, in accordance with other studies (Van Dusseldorp et al., 1988; Maiburg et al., 2004; Nicholas et al., 2005). However, a study in eleven European countries showed that more than half of the family doctors were sceptical of helping patients to achieve or maintain normal weight (Brotons et al., 2005). In addition, another study showed that 73% of family doctors believe counselling on weight reduction is not easy (Fogelman et al., 2002).

Family doctors like to motivate

Our study revealed that the motivational nutrition communication style was most dominant. In addition, it was the best predictor for actual nutrition communication behaviour of family doctors and the second predictor for actual nutrition communication behaviour towards overweight. We believe, this is the first time that specific nutrition communication styles have been studied, so comparisons with other studies are hard to make. In two studies about (general) communication styles among physicians, the majority used informational communication styles instead of controlling communication styles (Roter et al., 1997; Lawson, 2002). Our qualitative study showed that most family doctors used an informational nutrition communication style and that the role of the motivational nutrition communication style was rising (Van Dillen et al., 2005b). This expectation was supported in this survey.

Style affected by individual and environmental variables

The best predictor for the motivational nutrition communication style was task perception of prevention. This variable was also found in multiple regression analysis of determinants of actual nutrition communication behaviour (Hiddink et al., 1997b). We commented that especially secondary and tertiary prevention were decisive, because higher scores were found on these types of prevention than on primary prevention. This is in agreement with another study, in which family doctors believed their role is primarily in individual work with those who have a health problem, and less in work in primary prevention (Pavlekovic & Brborovic, 2005).

The study of Hiddink et al. (1997) focused on family doctors' individual attitudes and beliefs towards nutrition communication. However, environmental variables, including patient variables (like patient's complaint), office variables (like length of consultation) and health professional's

variables (suitability of information sources) might influence the nutrition communication style and actual nutrition communication behaviour. Hence, we decided to include several individual and environmental variables in our hypothetical model. Our results indicate that individual variables were more prominent than environmental variables. There were no socio-demographic correlates, which might imply that one's nutrition communication style is mainly shaped by practice, during working experience of many years.

Total explained variances for nutrition communication styles were relatively high and higher than explained variances for actual nutrition communication behaviour found in a previous study (Hiddink et al., 1997b). However, individual and environmental variables might indirectly have an influence on actual nutrition communication behaviour by the way of nutrition communication styles. These outcomes strengthen our feelings about the importance of nutrition communication styles.

Adaptation of style: family doctors as chameleons

In contemporary busy practice, family doctors seem to rely on their predominant nutrition communication style in order to deal with standard situations efficiently: for the majority, this proved to be the motivational nutrition communication style. This study suggests that family doctors behave like chameleons, by adapting their style to the specific circumstances. This study showed that if family doctors communicate about nutrition in general, they select any of the five nutrition communication styles. If they communicate about overweight, they pick either the confrontational or motivational style. In addition, the context, time and patient might influence one's communication style.

With respect to context, office and health professional's variables might determine the communication style. For instance, nurse practitioners or practice assistants assist some family doctors. We expect that family doctors might adapt their nutrition communication style through this co-operation. Lawson (2002) showed that both physician and nurse practitioners used more informational styles than controlling styles.

In the case of time constraints, it is possible that family doctors let the subject nutrition go at the end of their working day and abandon their nutrition communication.

With respect to the patient, patient satisfaction with the medical encounter is assumed to be directly related to physicians' communication style (Klein Buller & Buller, 1987). Supposing that family doctors' nutrition communication style has an effect on patient satisfaction too, they might adapt to the patients' nutrition communication style. Communication geared to the individual

patient will generate feelings of positive treatment and a good work atmosphere (Van Woerkum, 2003).

Implications for practice and research

Our study showed that family doctors used a combination of nutrition communication styles. The choice for a particular style depends on the specific circumstances, like context, time and patient. It is important that family doctors have knowledge of these styles and perform them properly. Attention to the combination of different nutrition communication styles might be useful in vocational training programs of family doctors' trainees.

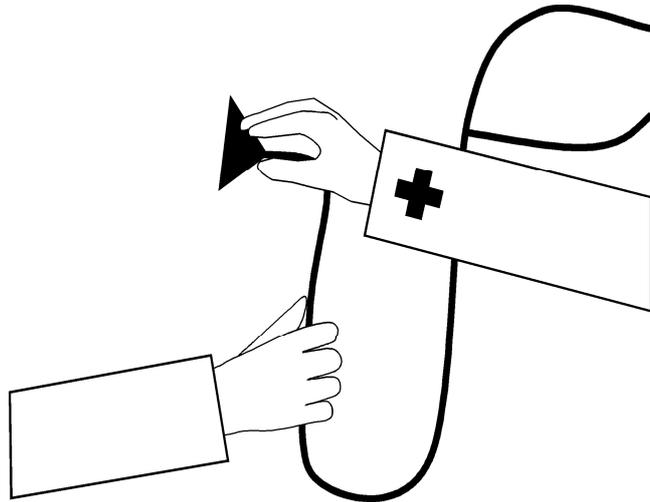
We conclude with some practical recommendations to extend communication skills:

- Motivate patients to eat healthily: family doctors should guide patients with dietary change. They should try existing methods, like Motivational Interviewing or the 5 As (Assess, Advise, Agree, Assist, Arrange follow-up) (Kolasa, 2005). Although the motivational nutrition communication style was used by most family doctors, it is important that one is prepared to use other styles.
- Confront overweight patients: nowadays overweight occurs in 40% of the Dutch adults (Visscher et al., 2002). They might contact family doctors more often with health complaints. Family doctors should be aware of the fact that they are perceived as the best source to provide information about losing weight (Van Dillen et al., 2004). Family doctors experienced difficulties in communicating about overweight and mentioned that they miss a practical tool: to meet these needs, a practical tool should be developed.
- Refer to dieticians: Family doctors could capitalise on their positive experiences regarding co-operation with dieticians in the past. In the case of more complicated topics, family doctors should utilise the expertise of dieticians. Application of the Team Approach might be useful (Fogelman et al., 2002).

Finally, it is useful to assess these nutrition communication styles during observations of medical consultations between family doctors and patients.

CHAPTER 8

CONCLUSIONS AND DISCUSSION



This thesis describes several studies with respect to nutrition communication between family doctors and patients. A two-sided approach was chosen, taking into account the perspective of patients and the perspective of family doctors. This chapter starts by answering the research questions. In addition, the main conclusions of these studies will be presented. Moreover, comparisons between our empirical data and results from the review provided in Chapter 2 will be made. Finally, implications for research and practice will be given.

BACK TO THE RESEARCH QUESTIONS: RESULTS AND CONCLUSIONS

The first research question concerned the communicative characteristics of patients regarding nutrition communication through family doctors (beliefs, knowledge, attitudes, motivations, behaviour).

Chapter 3 showed that the respondents in our qualitative study had different food associations, such as safe food, tasty food and healthy food. They believed they had sufficient knowledge about healthy food. They mentioned several food topics as important topics, including food safety, fruit and vegetables, genetic modification of food and vitamins. Family doctors were perceived as a suitable nutrition information source, especially in relation to disease in general. In addition, patients believed they ate healthily, but we could not derive their actual nutrition behaviour from the focus groups. Previous research showed that people overestimate healthy nutrition behaviour, such as fruit and vegetable intake, while they underestimate unhealthy nutrition behaviour, such as fat intake (Brug et al., 1994; Lechner et al., 1997). People who overestimated their healthy nutrition behaviour, or underestimated their unhealthy nutrition behaviour, were not likely to intend to change their nutrition behaviour. This so-called lack of awareness could be a major barrier to changing nutrition behaviour through nutrition communication. Nutrition awareness is important, and further research was required to unravel the concept of nutrition awareness. As a result, we developed a hypothetical model for nutrition awareness, including both socio-demographic and psycho-social variables. This hypothetical model was tested in a quantitative study. Data from the qualitative study were also used in order to develop the questionnaire for the quantitative study. In this way, qualitative research and quantitative research complement each other (Wester, 2004). Green & Kreuter (2005) state that triangulation is possible when different research methods are used or different target groups are reached to assess common issues. In our study, both patients and family doctors can be seen as target groups. Triangulation can be defined as using more than one research approach to answer the same research question (Koelen & Van den Ban, 2004).

Conclusions and discussion

Patients' perceptions of nutrition communication were also assessed in a quantitative study. Chapter 4 showed that patients associated food most frequently with tasty food. Patients perceived their own nutrition knowledge as fair to good. They rated food topics, such as balanced diet, fruit and vegetable intake, and eating less fat, as extremely important. These food topics are reflected in the dietary guidelines. However, we found a discrepancy between perceived relevance (i.e. importance) and urgency (i.e. information needs) of food topics. Despite high-perceived relevance of these food topics, most respondents pointed out that they did not feel a need for more information about these topics. It seems that there was a sort of satiation; possibly patients felt that they already knew enough about dietary guidelines from many campaigns of the Nutrition Center. On the other hand, patients rated several food topics related to health and safety as of moderate or low importance, while they expressed a need for more information on these topics. Apparently, only small groups of people were engaged with the particular topic.

For more effective nutrition communication, it is essential to identify the sources from which patients seek information. For most food topics, family doctors were mentioned. With respect to losing weight and lowering cholesterol, family doctors were perceived as having the highest potential to communicate effectively to patients. In addition, family doctors were perceived as the most reliable and accessible nutrition information source. After the dietician, they were also perceived as most expertised and clear. Similar results have been found in the study of Hiddink et al. (1997a), which showed that the level of perceived expertise of the family doctor was among the highest. The dietician and the Food and Nutrition Education Bureau (now called the Netherlands Nutrition Center) had a slightly higher perceived expertise.

We expected that the relative importance of differential nutrition information sources had changed over the past ten years. Moreover, new information sources, like the Internet, have been developed. Therefore, we included information sources, such as the Internet and the direct environment (family, friends and neighbours), in our study. Our expectation that new information sources have appeared on the stage did not come true: our study showed that these sources were not preferred as the first-choice nutrition information source. However, both family doctors and patients increasingly use the Internet. Web-sites about health are very popular. For the moment, however, the Internet hardly plays a part in the interaction between family doctors and patients. The Internet does not necessarily have a negative influence on the interaction between family doctors and patients. Patients with specific questions about nutrition can direct themselves for their first orientation to family doctors to help them. If family doctors have knowledge about reliable web-sites and concentrate on the patient, the Internet represents enrichment (Ter Telgte et al., 2004).

In Chapter 5 the focus of attention is nutrition awareness. Awareness is an important concept in the Stages of Change Model (Prochaska & Velicer, 1997) and the Precaution Adoption Process Model (Weinstein, 1988). In the literature, no clear definition of nutrition awareness was given. Therefore, we thought it useful to unravel the concept of nutrition awareness. Our hypothetical model for nutrition awareness, derived from the qualitative study, including both psycho-social and socio-demographic variables, was tested in our quantitative study. Psycho-social correlates of nutrition awareness were assessed, including individual and environmental variables. Individual variables (such as involvement with nutrition and specific associations with food) proved to be better predictors for nutrition awareness than environmental variables (such as perceived attributes of nutrition information sources). Two socio-demographic correlates had an additional influence on nutrition awareness, namely, gender and age. Women were more nutrition aware than men. The elderly were also more nutrition aware than younger age groups. Moreover, the relationship between nutrition awareness and nutrition-related behaviours was assessed. Respondents with high nutrition awareness ate more often in accordance with recommendations, whereas people with low nutrition awareness overruled the recommendations by eating too many carbohydrates and too much fat. Finally, respondents with low nutrition awareness perceived family doctors as being more suitable for providing nutrition information than respondents with high nutrition awareness.

It can be concluded that patients had different associations about food: tasty food was most common. In addition, they perceived their own nutrition knowledge as fair to good. The fact that patients rated certain food topics as important does not necessarily mean that they wanted more information on these topics; probably they received enough information about dietary guidelines from the media. Furthermore, they were generally positive about nutrition communication through family doctors. Since patients tend to mistakenly rate their nutrition behaviour, nutrition awareness is considered as essential to accomplish behavioural change.

The second research question concerned the communicative characteristics of family doctors regarding nutrition communication towards patients (beliefs, knowledge, attitudes, motivations, behaviour).

Chapter 6 showed that family doctors in our qualitative study held a dualistic position regarding their nutrition knowledge. They believed they had a restricted nutrition knowledge base, being aware of the functions and recommended amounts of different nutrients. They acquired this information during their vocational training. Some family doctors considered this type of knowledge as sufficient for dealing with basic nutrition issues related to the most common health

Conclusions and discussion

problems. For more comprehensive nutrition advice, they referred their patients to dietitians. Others, however, mentioned lack of knowledge and lack of time as barriers to providing nutrition information. In addition, they perceived nutrition communication as their task, as well as communication about overweight. It is not seen as an easy task: they more often saw patients who wanted to lose weight than patients who had successfully lost weight. It appeared that family doctors perceived themselves as having low self-efficacy to provide nutrition information. With respect to information seeking behaviour, reading scientific studies, reading specialist literature and attending postgraduate training courses were mentioned. However, family doctors were not very active in seeking information about nutrition. With respect to strategies regarding nutrition communication, we tried to arrange the data into the categories proposed by Glanz et al. (1995). These strategies can be considered as nutrition-related practices, such as providing specific nutrition information, setting short-term goals, increasing patient motivation, recommending specific dietary changes, and giving maintenance advice. However, we felt that referring patients to other health professionals was missing in this perspective. We ended up with several other strategies regarding nutrition communication, such as referring to a dietitian, providing advice according to dietary guidelines, offering written education materials, offering patient information letters, and referring patients to a course.

A few studies have been carried out to assess general communication styles of family doctors (Roter et al., 1997). Nutrition is often prevention-tinted, and this requires more specific communication styles. The topic of nutrition does not slot easily into the biomedical communication styles (that means giving biomedical information), such as in the arrangement of Roter et al. (1997) into narrowly biomedical, expanded biomedical, biopsychosocial, psychosocial and consumerist. A differentiation into specific nutrition communication styles makes these styles more recognisable for family doctors. From the focus groups with family doctors, we were able to identify nutrition communication styles that could be used as input for a questionnaire. Five nutrition communication styles were identified in our qualitative study, namely, informational, reference, motivational, confrontational and holistic. An informational style means providing information about nutrition and health. A reference style stands for calling on other health professionals to deal with nutrition problems. A motivational style means guidance in dietary change. A confrontational style stands for warning about nutrition problems related to a health complaint. A holistic style stands for involving several aspects as being part of living circumstances. In addition, a hypothetical model for nutrition communication style was developed, including socio-demographic and psycho-social variables.

This hypothetical model was checked in a quantitative study. Results of the qualitative study were used for the development of the questionnaire for the quantitative study, described in Chapter 7.

Chapter 7 showed that family doctors perceived the topic of nutrition as fairly important. Most family doctors perceived their own nutrition expertise as fair on a scale from bad to good. Generally, they perceived it as their task to communicate with patients about nutrition, especially in the case of secondary and tertiary prevention. Specifically, they perceived referral mainly as a task for family doctors, while providing specific nutrition was mainly perceived as a task for dietitians. Motivating patients was perceived equally as a task for both family doctors and dietitians. Where nutrition is involved, family doctors co-operated most often with dietitians. Nutrition was discussed in 14% of family doctors' consultations with patients each month. Mean duration of nutrition communication was five minutes. Our study among Dutch family doctors showed that 56% of these family doctors generally took the initiative themselves to communicate about nutrition, 4% mentioned that the initiative was mainly taken by the patient. Another 40% said the initiative was equally divided between family doctors and patients. Nutrition was most often discussed with patients who had health complaints, such as overweight/obesity and diabetes mellitus. However, family doctors also expressed some difficulties with providing nutrition information in their busy practice. First, they showed a low self-efficacy to provide nutrition information. Family doctors found it even more difficult to communicate about overweight. They believed that their nutrition knowledge could be further improved. In addition, family doctors mentioned that they needed resources with respect to nutrition information and training, such as a practical tool to deal with overweight patients, a course, a magazine or a web-site. With respect to strategies regarding nutrition communication, providing advice in conformity with dietary guidelines, referring to a dietitian and clarifying physical examinations (blood pressure, weight, etcetera) were frequently mentioned. Combinations of different strategies were used. Giving specific maintenance advice was hardly mentioned.

Studies about general communication styles have been conducted but, to our knowledge, this is the first study in which specific nutrition communication styles were studied. The nutrition communication styles derived from the qualitative study (Chapter 6) were assessed, i.e. informational, reference, motivational, confrontational and holistic nutrition communication styles. Mean scores were highest for the motivational nutrition communication style. Many family doctors felt at ease with a motivational style. Roter et al. (1997) found that the majority of doctors used only one general communication style in most of their consultations. However, our study showed that family doctors used a combination of specific nutrition communication styles. Similar results have

Conclusions and discussion

been found in a recent study about dietary advice-giving styles among nurses. Nurses relied upon a quite narrow selection of communication styles that helped them to control the topics and the situation (Kiuru et al., 2004). We suggest that family doctors behave like chameleons, by adapting their style to the specific circumstances, such as context, time and patient.

To understand why family doctors select a certain nutrition communication style, our hypothetical model for nutrition communication style was tested, including psycho-social and socio-demographic correlates. From the psycho-social correlates, individual variables (such as task perception of prevention) appeared to be better predictors than environmental variables (such as patient variables). Moreover, socio-demographic correlates had no additional influence on nutrition communication style. Finally, the relationship between nutrition communication styles and actual nutrition communication behaviour was assessed. If family doctors communicate about nutrition in general, they prefer a motivational nutrition communication style. If they communicate about overweight, they pick a confrontational nutrition communication style.

To conclude, family doctors perceived the topic nutrition as important. They perceived their own nutrition knowledge as fair. Furthermore, they were positive about nutrition communication towards patients. However, family doctors did not always feel capable of providing nutrition information. Their self-efficacy to communicate about overweight was rather low. They also felt that their nutrition knowledge could be improved, and they expressed a need for a practical tool to deal with overweight patients. Besides, some family doctors directly referred their patients to a dietician when nutrition was involved. Although family doctors used a combination of different strategies regarding nutrition communication, they most often referred to a dietician or provided advice in conformity with dietary guidelines. We also concluded that most family doctors felt at ease with a motivational nutrition communication style. Moreover, they used a combination of nutrition communication styles.

The third research question concerned the integration of the perspective of patients and the perspective of family doctors. Patients expected nutrition communication from their family doctors, but these expectations were not met by their family doctors, who did not feel capable of providing nutrition information. There are many opportunities for nutrition communication in general practice, but these are often not taken up. In Chapter 2, we provided an overview of the state of the art regarding nutrition communication in general. One of the main conclusions was that patients were positive about nutrition communication through family doctors. Although family doctors were positive about nutrition communication, they also perceived some barriers (such as lack of time,

lack of training, lack of skills, and lack of patient motivation). Moreover, they were cautious about whether behavioural change could be easily achieved. These conclusions served as input for recommendations for more effective nutrition communication. We will further elaborate on recommendations for research and practice at the end of this chapter.

In 1997, Makrides et al. presented a prevention practice model for family doctors and counselling about coronary heart disease prevention. The model was based on a qualitative study and related literature, and was intended as a framework by which family doctors might more effectively counsel their patients about coronary heart disease. Likewise, in this thesis, two hypothetical models were developed and tested. In Chapter 3, a hypothetical model for nutrition awareness among patients was developed. This model was tested in Chapter 4. In Chapter 6, a hypothetical model for nutrition communication style among family doctors was developed and subsequently tested in Chapter 7. Both models included psycho-social correlates, distinguishing individual and environmental variables. We tried to combine both models and map the psycho-social components of patients and family doctors in a collinear model (**Figure 8.1**). This model clarifies the interdependence of the two conversation partners. The family doctors' choice of one of the five nutrition communication styles depends on several factors, such as family doctors' individual variables (such as perceptions of lifestyle, perceptions of nutrition communication and perceptions of nutrition information) and environmental variables (such as patient, office and health professionals). Consequently, family doctors' nutrition communication style might have an influence on the patients' individual variables (such as interest in nutrition) and environmental variables (such as perceived attributes of the information source: family doctors). As a result, patients' nutrition awareness might increase.

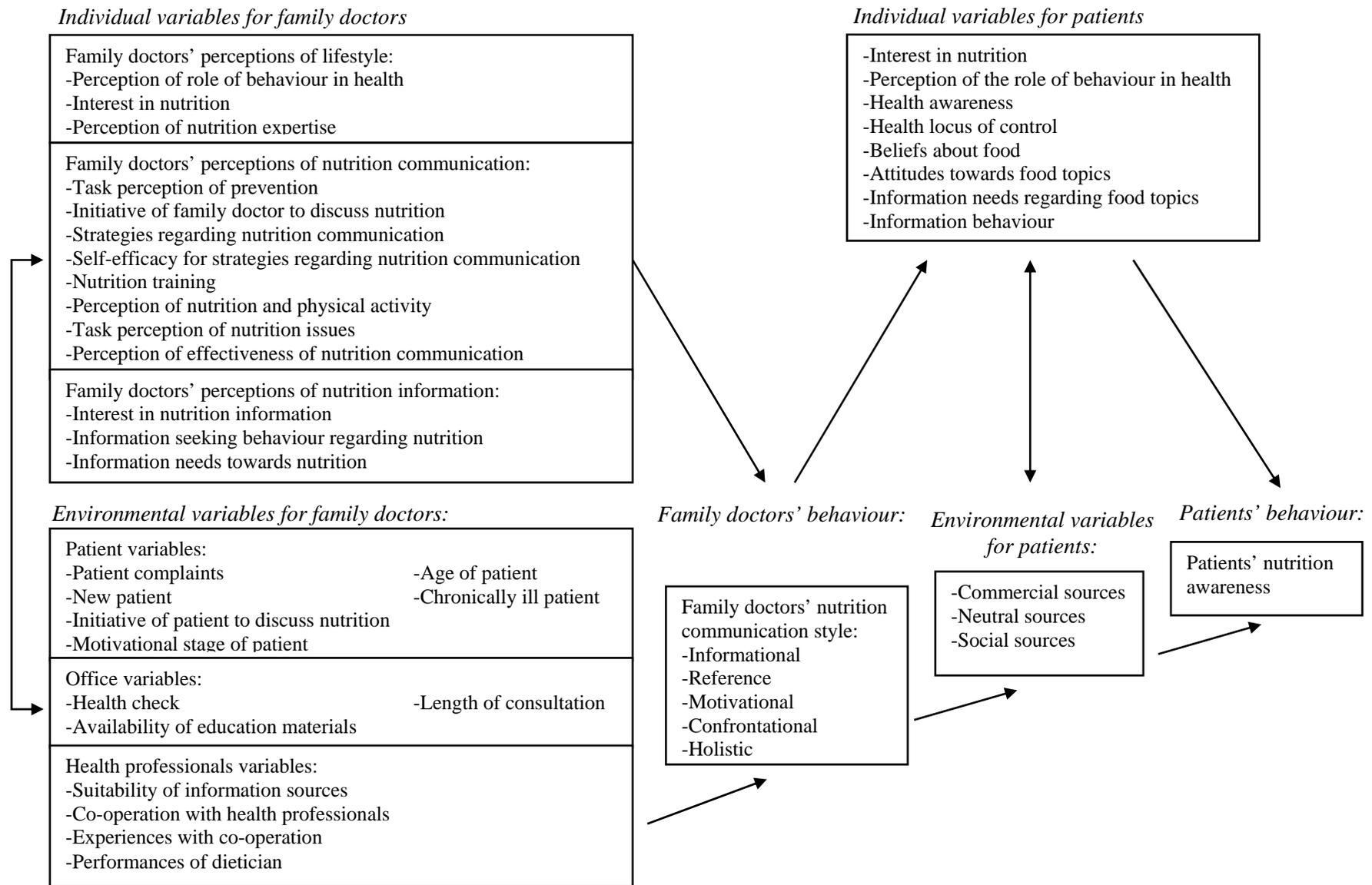


Figure 8.1. Collinear model for family doctors and nutrition communication towards patients

SIX MAIN CONCLUSIONS

Conclusion 1: Patients expect nutrition communication from their family doctors.

Family doctors were generally perceived as the most reliable and accessible nutrition information source. Patients' attitudes towards nutrition communication through family doctors were favourable. They expected nutrition communication from their family doctors. From the perspective of the patient, nutrition communication through family doctors is initially not problematic. However, in subsequent consultations lack of patient motivation with behavioural change is potentially a problem for nutrition communication.

Conclusion 2: Patients perceive family doctors as the best sources for information about food topics, such as losing weight and lowering cholesterol.

There were differences in patients' perceptions regarding family doctors as information sources for specific food topics. Family doctors were perceived as being extremely suitable for providing information about health-related food topics, such as losing weight and lowering cholesterol. For three subgroups with a significant information need, family doctors were mentioned as the best nutrition information source. Compared to patients with normal weight, overweight patients had a significant information need regarding losing weight. Female patients also expressed a higher need for information about losing weight than male patients. The elderly were more interested in information about lowering cholesterol than other age groups. In addition, family doctors were also perceived in the top 3 of information sources with the highest potential to communicate effectively about food allergy, nutrition and drugs, and minerals.

Conclusion 3: Patients with low nutrition awareness perceive family doctors as the best nutrition information source.

In our study we decided on the basis of overall scores to divide patients into either a group with low nutrition awareness or a group with high nutrition awareness. Patients with low nutrition awareness found family doctors (and health professionals in general) more suitable as a source for nutrition information than did patients with high nutrition awareness.

Conclusions and discussion

Conclusion 4: Family doctors provide mainly basic nutrition information to their patients.

Family doctors were ambivalent regarding nutrition knowledge. They felt that they had a restricted nutrition knowledge base. However, they perceived this knowledge as adequate for providing basic health-related nutrition information to their patients. In the case of more complex nutrition information, they referred their patients to other health professionals, such as dietitians.

Conclusion 5: Family doctors use a combination of nutrition communication styles, depending on the situation.

Family doctors adapted their styles to the specific circumstances, such as context, time or patient. With respect to context, office and health professional variables were related to family doctors' nutrition communication style. Through co-operation with other health professionals, family doctors might adapt their nutrition communication style. With respect to time, nutrition might not be a topic at the end of the working day. In addition, specific patient characteristics, such as the type of health complaint, might require a different nutrition communication style. For communication about nutrition in general, family doctors used all five nutrition communication styles. For communication about overweight, they used a confrontational or motivational nutrition communication style.

Conclusion 6: Family doctors have a low self-efficacy to communicate about overweight.

Family doctors found it rather difficult to communicate about overweight. They felt that their knowledge could be improved. Lack of time was also a barrier to communicate about overweight. In addition, family doctors more often observed patients who wish to lose weight than patients who had successfully lost weight. Lack of patient motivation might contribute to failure experiences of family doctors. Moreover, they expressed a need for a practical tool to deal with overweight patients.

COMPARISON OF LATEST EVIDENCE WITH THE RESULTS OF THIS STUDY

In Chapter 2, a review about nutrition communication in general practice was described, incorporating publications from 1995 to 2005. Below we shall make comparisons between the results of the studies of Hiddink et al. (1995/1997a/1997b/1997c/1997d/1999) and the results from recent studies presented at the Fourth Heelsum International Workshop (Truswell et al., 2005; Nicholas et al., 2005; Pavlekovic & Brborovic, 2005; Kolasa, 2005; Brotons et al., 2005) on the one hand, and our empirical studies on the other hand, in order to provide contemporary recommendations for more effective nutrition communication in general practice. Therefore, we shall provide conclusions about the occurrence of nutrition communication in general practice, from both the patients' and the family doctors' perspective.

Conclusions about occurrence

The picture about the occurrence of nutrition communication in general practice in our empirical studies is comparable with the results of studies derived from Chapter 2. Chapter 2 showed that family doctors' actual nutrition communication behaviour differed widely, depending on the measurement method used. Our study belongs to the third series of studies as reported in Chapter 2, taking into account the percentage of consultations in which nutrition was discussed by family doctors. Chapter 7 showed that the percentage of consultations in which family doctors self-reported nutrition communication was still around 15%, in agreement with other studies. We conclude that nutrition is a daily topic in general. Moreover, nutrition communication takes about five minutes per consultation.

However, there were some changes in nutrition communication in general practice. It can be concluded that in our study it is mainly the family doctors who initiate nutrition communication with their patients. However, we did not ask patients how often they initiated nutrition communication. It is possible that patients bring up the topic of nutrition, but that family doctors do not notice this at all. We expected that the initiative of the family doctor to discuss nutrition would be related to the family doctor's nutrition communication style. Chapter 7 showed that the initiative of the family doctor to discuss nutrition was a predictor for the motivational and informational nutrition communication style.

Furthermore, as mentioned before, Chapter 2 showed that data from family doctors' actual nutrition communication behaviour varied widely, depending on the measurement method used. In Chapter 7, we took an alternative approach, by concentrating on the nutrition communication styles

of family doctors. Total explained variances for nutrition communication styles (up to 57%) were relatively high and even higher than explained variance for actual nutrition communication behaviour (32%) found in a previous study (Hiddink et al., 1997b). Therefore, we suggest that individual and environmental variables may indirectly have an influence on actual nutrition communication behaviour by way of nutrition communication styles.

Conclusions about the patients' perspective

The picture about patients' perceptions regarding nutrition communication in our empirical studies is comparable to the picture arising from the studies described in Chapter 2. Patients' perceptions regarding nutrition communication through family doctors were generally positive. Patients preferred family doctors as a source for nutrition information. They perceived family doctors as reliable and expert nutrition information sources. In addition, patients expected nutrition communication from their family doctors.

Some differences were also found, since the Nutrition Center was hardly mentioned in our study among Dutch patients (Chapter 4). Moreover, we assessed additional characteristics in this study, such as the accessibility and clearness of the message, and family doctors ranked also among the highest (Chapter 4). Family doctors were perceived as a good nutrition information source for more health-related topics. Our study showed that new food topics, such as food safety, genetic modification of food, and functional foods, were hardly discussed with family doctors. Furthermore, we tend to conclude that the appearance of new media, including the Internet, has not lead to changes in the preferred nutrition information sources. Finally, patients' medical complaints frequently leading to nutrition communication were still obesity and diabetes, and their comorbidities. Frequencies were even higher than before. Keeping in mind the current increases in the prevalence of obesity and diabetes, we expect that nutrition will be even more discussed in general practice in the future.

Conclusions about the family doctors' perspective

Our results were comparable with the results of Chapter 2. Family doctors' perceptions regarding nutrition communication were generally positive. However, many family doctors perceived barriers to nutrition communication.

A difference is that our study showed that interest in nutrition among family doctors is higher than before. Moreover, in our recent study lower self-efficacy scores were found with respect to overweight. Another conclusion is that family doctors' strategies regarding nutrition

communication are measured in different ways. Comparisons between studies should therefore be made with caution. However, it appears from our study that family doctors use several strategies regarding nutrition communication, varying from referring to a dietician to assessing readiness to change. Family doctors do not solely use one strategy but may switch over to another strategy. With respect to overweight, family doctors still lack a practical tool to deal with overweight patients.

IMPLICATIONS FOR RESEARCH

On the basis of our studies, the following recommendations for research are suggested:

Undertake an observational study about nutrition communication styles

In Chapters 6 and 7, we identified and assessed nutrition communication styles of family doctors. For further research, we recommend the undertaking of an observational study about nutrition communication styles of family doctors. In this way, it can be studied whether nutrition communication styles are recognisable in routine practice. Moreover, observations can provide valuable insight into family doctors' actual nutrition communication behaviour by registering the percentage of consultations in which nutrition is discussed by family doctors.

Develop a practical tool for overweight

Family doctors play a major role in prevention and providing nutrition information, because of high access to high-risk subjects and existing continuity-of-care. Chapter 4 showed that the family doctor was perceived as a good nutrition information source, especially for overweight, and evaluated as the most reliable and accessible information source. Chapter 6 showed that family doctors reflected a need for a more effective strategy to deal with overweight patients. In several NHG-guidelines, the risk of overweight and the need to intervene is pointed out (Van Binsbergen & Drenthen, 2003). However, most family doctors lack an adequate intervention strategy. More research about what constitutes an effective strategy to provide information to overweight patients is desirable: this of necessity must be easy and feasible in general practice. Therefore, we recommend developing a practical tool for family doctors in order to deal with overweight patients. A Minimal Intervention Strategy (MIS) for overweight patients in general practice may be useful. An MIS is a brief protocol or a convenient, tested method to guide patients. This strategy is characterised by a brief intervention, tailoring according to stage of change, and a task division between family doctor and assistant (Pieterse et al., 2001). Although an MIS is rather minimal, this strategy is expected to be

cost-effective. Moreover, the newly introduced practice nurse might play a key role. The potential of an MIS is that the family doctor's time will be efficiently managed and communication will be most effective. Results from MIS for smoking cessation and exercise are promising (Pieterse et al., 2001; Van Sluijs et al., 2004a). In 2004, a study on the development of an MIS for overweight children was started, focused on youth physicians. As far as we know, no MIS for overweight adults has been developed. We see an MIS as a good opportunity to guide overweight patients, because this strategy offers a solution for family doctors' perceived barriers to providing nutrition information. The main barriers in a study among family doctors were lack of time, lack of education (training) on nutrition issues, and the perception that patients are not motivated to change their nutrition behaviour (Hiddink et al., 1995). Similar results have been found in our study. An MIS is, after all, brief and practicable in a limited time (which meets the barrier, lack of time), offers family doctors a training in which they learn to use the strategy (which meets the barrier, lack of training) and provides insight into the current stage of change in which tailored advice could be provided to help the patient towards a following stage (which meets the barrier, unmotivated patient). Moreover, it is important to strengthen family doctors' self-efficacy regarding communication about nutrition and overweight in particular. We expect an MIS to have a promising effect on the lifestyle of overweight patients. By a promising effect, we mean a significant, measurable and meaningful effect. However, before developing an MIS, further research is needed to understand the scientific and practical feasibility of an MIS for overweight patients in Dutch general practice.

IMPLICATIONS FOR PRACTICE

In this section, recommendations for practice will be given in order to improve nutrition communication between family doctors and patients. In general, we recommend that family doctors carefully prepare their communication steps in order to be effective in modifying nutrition behaviour. Therefore, it is important that they take account of conditions for effective nutrition communication as described in Chapter 1, such as addressing personal relevant motivators, using tailoring, taking account of stage of dietary change, and taking care of long-term maintenance of change (Contento et al., 2002). The recommendations for practice are:

Convince family doctors that they are highly esteemed by patients

We recommend convincing family doctors that patients prefer them as providers of nutrition information. The conditions for effective nutrition communication that are strongly connected to this recommendation are the use of active interpersonal strategies and the use of non-traditional channel (Contento et al., 2002).

First of all, general practice is a setting in which interpersonal communication takes place. Chapters 4 and 5 showed that patients expected nutrition communication from their family doctors. Family doctors were perceived as the most reliable and accessible nutrition information source, and after the dietician, the most expertised and clear. Chapter 6 showed that family doctors had the impression that patients expect nutrition communication from them. However, family doctors did not realise that patients judged them to be superb in the case of nutrition communication, and that they were rated as the most suitable nutrition information source. Furthermore, Chapter 5 showed that patients lacked nutrition awareness. Nutrition awareness can be increased with self-assessment of personal intake in combination with personal feedback as active interpersonal strategies. Family doctors do not often apply self-assessment on their patients. Therefore, we recommend giving more attention to communication strategies for changing nutrition behaviour, including strategies aimed at consciousness raising.

A non-traditional channel mentioned by Contento et al. (2002) is the Internet. However, our studies showed that the Internet was not very often used during nutrition communication between family doctors and patients. Another non-traditional channel mentioned is motivational interviewing. Kolasa (2005) discussed how motivational interviewing might be an interesting new tool for family doctors in their nutrition communication with patients. A few minutes spent listening to the patient and tailoring the intervention to the patient's stage of change can improve communication and outcome (Zimmerman et al., 2000). Starting with brief and simple advice makes sense, because some patients will indeed change their behaviour on the direction of their physician. Our study showed that patients with low nutrition awareness relied more on family doctors than did patients with high nutrition awareness (Chapter 5). Therefore, we recommend to family doctors that they take the challenge to provide nutrition information to patients with low nutrition awareness (or who are in the precontemplation phase).

Tailor the information needs of interested subgroups

Next, it is recommended that family doctors tailor the information needs of specific subgroups. The use of tailoring is one of the conditions for effective nutrition communication. Moreover, this recommendation also connects with the condition of taking account of stage of dietary change (Contento et al., 2002).

Tailoring can be put into action, if information needs are known. In Chapter 4, specific information needs regarding food topics were measured among subgroups, based on gender, age, perceived weight and socio-economic status. In the case of significant differences in information needs between subgroups, we advised providing tailored information by way of the subgroup's preferred information source. It appeared that family doctors were perceived as the most suitable information source for health-related food topics, such as losing weight and lowering cholesterol. We recommend that family doctors tailor the information need regarding losing weight and disseminate this information among interested subgroups of women and overweight people. It is recommended that family doctors raise the issue of weight in their face-to-face contacts with their patients. It is important that family doctors discuss a realistic body image and that weight loss can be achieved through a combination of nutrition and physical activity. Moreover, we advise that family doctors tailor the information need regarding lowering cholesterol and disseminate it among the subgroup of the elderly too, because doctors are the preferred information source for the elderly. Family doctors can use the NHG standard and patient information letters, composed by the Dutch College of General Practitioners.

Tailoring can also be applied in stages of change. People in the precontemplation stage need more information and guidance than others. Since family doctors are perceived as the most suitable information source among people with low nutrition awareness, they are ideally placed to convey nutrition communication to this group (Chapter 5).

Take account of information on demand

In addition, we stress the importance of information on demand. This recommendation connects with the use of a non-traditional channel, according to Contento et al. (2002).

As mentioned before, the Internet is considered as a non-traditional channel. Chapter 4 showed that patients who are not yet interested in information might be triggered by a life event and transform a relevant food topic into an urgent food topic. Therefore, we consider it important that reliable information is available on the Internet web-sites at the time patients need this. Moreover,

patients may also contact health professionals, if they need information. Consequently, family doctors should have knowledge of reliable web-sites.

Take account of raising nutrition awareness

It is recommended to raise nutrition awareness among patients. This recommendation links with the following conditions for effective nutrition communication, namely, behaviourally focused, take account of stage of dietary change, address personal relevant motivators and enhance direct involvement with food (Contento et al., 2002).

With respect to the behaviourally focused condition, measuring nutrition behaviour with the aid of a food frequency questionnaire is very time-consuming. We agree with the focus on nutrition behaviour. Nevertheless, we believe that nutrition awareness is just as important as nutrition behaviour, because nutrition awareness can serve as a prerequisite. Chapter 3 showed that patients might think they eat healthily, but actually they do not eat healthily at all. The creation of nutrition awareness is of utmost importance, because obesity has emerged as a serious global health problem. Our questionnaire makes it possible to make a distinction between people who are aware and those who are not aware. Consequently, nutrition communication can be tailored.

Keeping in mind the stages of change, Chapter 5 showed that patients with low nutrition awareness perceived family doctors as most suitable to provide nutrition information. Accordingly, we advise convincing family doctors that they are suitable to provide nutrition information to patients with low nutrition awareness. Patients with low nutrition awareness are considered to be in the first phase of the Stages of Change Model, namely, the precontemplation stage. Family doctors can play a role in moving people from precontemplation (not aware of risky nutrition behaviour) to the contemplation stage (aware of risky nutrition behaviour). This shift may be difficult, but family doctors can use their authority to endorse messages and trigger patients. It is recommended that family doctors take advantage of this opportunity by providing stage-specific information to patients with low nutrition awareness. Communication strategies aimed at consciousness raising can be put into action in order to effect a shift from precontemplation to contemplation. Other communication strategies are personalised feedback and personal relevance.

This recommendation also connects with the condition of addressing personal relevant motivators. In Chapter 5, we assessed the psycho-social correlates of nutrition awareness. We measured several predisposing factors, including nutrition knowledge, beliefs, perceived relevance of food topics and information needs regarding food topics. Reinforcing factors in our study were perceived attributes of nutrition information sources and expectations regarding nutrition

Conclusions and discussion

communication through family doctors. An enabling factor concerns the accessibility of nutrition information sources. It is recommended that family doctors address personal relevant motivators in order to raise nutrition awareness.

Finally, the condition of enhancing direct involvement with food links with our result that involvement with nutrition was the best predictor of nutrition awareness (Chapter 5). We measured nutrition awareness using 17 propositions, including health considerations. Moreover, our questionnaire contained propositions about taste and food safety, so we were able to construct scales for tasty food awareness and food safety awareness (unpublished data). We advise family doctors to take involvement with nutrition into consideration.

Pay attention to nutrition communication styles

We recommend that family doctors realise that they can use a combination of nutrition communication styles, which can be applied in different situations. This recommendation links with the following conditions for effective nutrition communication, namely, using active interpersonal strategies and taking care of long-term maintenance of change (Contento et al., 2002).

With respect to using active interpersonal strategies, Chapters 6 and 7 showed that several strategies regarding nutrition communication can be distinguished. Moreover, we identified and assessed five specific nutrition communication styles, namely, informational, reference, motivational, confrontational and holistic. Chapter 7 showed that, if family doctors communicate about overweight, they use either the confrontational or motivational nutrition communication style. If family doctors communicate about nutrition in general, they select any of the five nutrition communication styles, but the majority select the motivational nutrition communication style. Kiuru et al. (2004) suggested that health professionals might need to become more aware of their counselling practices in routine situations. This requires the conscious effort of self-evaluation, which becomes possible for example with video-based educational interventions.

Therefore, we specifically recommend that more attention be devoted to nutrition communication styles in vocational training for general practice and/or postgraduate courses. Chapter 6 showed that family doctors felt that they have basic nutrition knowledge themselves. Chapter 7 showed that family doctors perceived their own nutrition expertise as fair. Vocational training for general practice should provide insight into actual developments in the field of nutrition, in order to respond adequately to expert patients. Chapter 5 showed that patients with low nutrition awareness, in contrast to patients with high nutrition awareness, perceived family doctors as most suitable to provide nutrition information. Therefore, we advise paying more attention in

training to communication strategies for changing nutrition behaviour, including strategies aimed at consciousness raising.

Finally, the condition of taking care of long-term maintenance of change links with our results. Chapter 6 showed that maintenance advice was hardly given to patients. Chapter 7 showed that family doctors perceived that they were more often visited by patients who wanted to lose weight than patients who successfully lost weight. Maintenance advice requires a great effort to prevent relapse to former undesired behaviour. Lack of time might be a reason why this type of advice is hardly given. If family doctors referred patients to dieticians, they might not revert to maintenance of change. Behavioural change is a process that takes time. Family doctors are in a position to give nutrition advice step by step over time. Continuity-of-care offers the opportunity of having regular contacts with patients in order to reinforce behaviour and prevent relapse. We advise family doctors to take care of long-term maintenance of change.

Final points for consideration

Contento et al. (2002) concluded that effective interventions are *behaviourally focused, and based on prior research and appropriate theory*.

As mentioned above, we agree with the focus on nutrition interventions that are behaviourally focused. Nevertheless, attention must also be paid to nutrition awareness, because nutrition awareness is often seen as the first step in behavioural change. There is definitely a gap between perceived and actual nutrition behaviour. People who believe they already eat healthily are not motivated to change their nutrition behaviour. Our model for nutrition awareness makes it possible to distinguish between people who have low nutrition awareness and those who have high nutrition awareness. Consequently, nutrition communication can be tailored.

With respect to prior research, this thesis included several studies that can serve as input for the development of an intervention. In addition, it is important that family doctors learn of best practices, for example the Counterweight Programme aimed at empowering primary care to tackle the obesity epidemic (Counterweight Project Team, 2004).

The third point concerns appropriate theory. No single theory has been universally accepted as sufficient to encompass the range of human experience (Green & Kreuter, 2005). This also holds true for nutrition behaviour. In Chapters 3 and 5, the Stages of Change Model and the Precaution Adoption Process Model were discussed in order to explain the concept of nutrition awareness. However, additional theories were also mentioned, such as the Elaboration Likelihood Model. As Elder et al. (1999) pointed out, consultation is ideally constructed of several parts, namely,

Conclusions and discussion

identification of the problem, assessing readiness to change, proposing an intervention, evaluating the intervention and maintaining the behaviour. Depending on the stage of consultation, different theories and models could be applied. For example, the Theory of Reasoned Action could be used in the second part, in assessing readiness to change. In the review of Elder et al. (1999), eight theories and models are linked to the different parts of the consultation. However, we suggest that several other theories and models about (nutrition) behaviour, behavioural change and interpersonal interaction can be useful for nutrition interaction between family doctors and patients. For instance, the interaction model, the Stages of Change Model and the Precede-Proceed Model can be used in all parts of the consultation (Linck, 2002).

In this thesis, we discussed the results of both qualitative and quantitative studies among patients and family doctors. The patients' perspective and family doctors' perspective were integrated and linked with conditions for effective nutrition communication in order to provide recommendations. We hope that our recommendations will contribute to more effective nutrition communication in general practice.

REFERENCES

- Anis NA, Lee RE, Ellerbeck EF, Nazir N, Allen Greiner K, Ahluwalia JS. Direct observation of physician counseling on dietary habits and exercise: patient, physician, and office correlates. *Prev Med* 2004; 38: 198-202.
- Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: results from a national survey. *JAMA* 2003; 289: 2400-2406.
- Baranowski T, Domei S, Gould R. Increasing fruit and vegetable consumption among 4th and 5th grade students: results from focus groups using reciprocal determinism. *J Nutr Educ* 1993; 25: 114-120.
- Basch CE. Focus group interview: an underutilized research technique for improving theory and practice in health education. *Health Educ Quart* 1987; 14: 411-448.
- Beaudoin C, Lussier MT, Gagnon RJ, Brouillet MI, Lalonde R. Discussion of lifestyle-related issues in family practice during visits with general medical examination as the main reason for encounter: an exploratory study of content and determinants. *Pat Educ Couns* 2001; 45: 275-284.
- Benoit WL, Stratheman A. Source credibility and the elaboration likelihood model. In: Seiter JS, Gass RH (ed.). *Perspectives on persuasion, social influence, and compliance gaining*. Pearson Education, Inc.: United States of America, 2004.
- Berenschot. Voedselveiligheid: *Waar borgen en waar zorgen*. Utrecht, The Netherlands: Berenschot, 1999 (in Dutch).
- Britt E, Hudson SM, Blampied NM. Motivational interviewing in health settings: a review. *Pat Educ Couns* 2004; 53: 147-155.
- Brotans C, Ciurana R, Pineiro R, Kloppe P, Godycki-Cwirko M, Sammut MR. Dietary advice in clinical practice: the views of general practitioners in Europe. *Am J Clin Nutr* 2003; 77: 1048S-1051S.
- Brotans C, Björkelund C, Bulc M et al. Prevention and health promotion in clinical practice: the views of general practitioners in Europe. *Prev Med* 2005; 40: 595-601.
- Brug J. Psychosocial determinants of fruit and vegetable consumption among adults: results of focus group discussions. *Food Qual Pref* 1994; 6: 99-107.
- Brug J, Van Assema P, Kok G, Lenderink T, Glanz K. Self-rated dietary fat intake: association with objective assessment of fat, psychosocial factors, and intention to change. *J Nutr Educ* 1994; 26: 218-223.
- Brug J, Glanz K, Van Assema P, Kok G, Van Breukelen GJP. The impact of computer-tailored feedback and iterative feedback on fat, fruit and vegetable intake. *Health Educ Behav* 1998; 25: 517-531.
- Budtz S, Witt K. Consulting the Internet before visit to general practice: patients' use of the Internet and other sources of health information. *Scand J Prim Health Care* 2002;20:174-176.
- Buttriss J. Food and nutrition: attitudes, beliefs and knowledge in the United Kingdom. *Am J Clin Nutr* 1997; 65: 1985S-1995S.

References

- Campbell MK, DeVellis BM, Strecher VJ, Ammerman AS, DeVellis RF, Sandler RS. Improving dietary behaviour: the effectiveness of tailored messages in primary care settings. *Am J Pub Health* 1994; 84: 783-787.
- Campbell K, Engel H, Timperio A, Cooper C, Crawford D. Obesity management: Australian general practitioners' attitudes and practices. *Obes Res* 2000; 8: 459-466.
- Cass Ryan V, Gates A. Nutrient intake status, knowledge, source of information and self-perceived health status among older adults in South Carolina. *J Nutr Eld* 1988; 2: 41-48.
- Chapman G, Maclean H. "Junk food" and "healthy food": meanings of food in adolescent women's culture. *J Nutr Educ* 1993; 25: 108-113.
- Clayton DB. Improving public awareness of nutrition issues. *Nutrition* 2000; 7/8: 637-639.
- Coleman T, Cheater F, Murphy E. Qualitative study investigating the process of giving anti-smoking advice in general practice. *Pat Educ Couns* 2004; 52: 159-163.
- Committee on biotechnology and food. *Eten en genen: een publiek debat over biotechnologie en voedsel*. The Hague, The Netherlands: Committee biotechnology and food, 2002 (in Dutch).
- Contento I, Balch GI, Bronner YL et al. The effectiveness of nutrition education and implications for nutrition education policy, programs and research: a review of research. *J Nutr Educ* 1995; 27: 277-420.
- Contento IR, Randell JS, Basch CE. Review and analysis of evaluation measures used in nutrition education intervention research. *J Nutr Educ Behav* 2002; 34: 2-25.
- Cornuz J, Ghali WA, Di Carlantonio D, Pecoud A, Paccaud F. Physicians' attitudes towards prevention: importance of intervention-specific barriers and physicians' health habits. *Fam Pract* 2000; 17: 535-540.
- Coulson NS. Sources of food safety information: whom do adolescents trust? *Appetite* 2002; 38: 199-200.
- Counterweight Project Team. Current approaches to obesity management in UK primary care: the Counterweight programme. *J Hum Nutr Dietet* 2004; 17: 183-190.
- De Almeida MDVP, Graça P, Lappalainen R et al. Sources used and trusted by nationally-representative adults in the European Union for information on healthy eating. *Eur J Clin Nutr* 1997; 51: S16-S22.
- De Graaf C, Stafleu A. Waarom eten mensen wat ze eten? In: Stasse-Wolthuis M, Kok GJ (ed.). *Van mond tot mond: voorlichting over voeding*. Houten/Zaventem, The Netherlands: Bohn Stafleu Van Loghum, 1992: 27-38 (in Dutch).
- De Graaf C, Van der Gaag M, Kafatos A, Lennerman M, Kearney J. Stages of dietary change among nationally representative samples of adults in the European Union. *Eur J Clin Nutr* 1997; 51: S47-S56.
- Department of Health. *The expert patient: a new approach to chronic disease management in the 21st century*. London: Stationery Office, 2001.
- Deveugle M, Derese A, De Maesenaer J. Is GP-patient communication related to their perceptions of illness severity, coping and social support? *Soc Sc Med* 2002; 55: 1245-1253.

-
- Di Nicolla DD, Di Matteo MR. Practitioners, patients, and compliance with medical regimes: a social psychological perspective. In: Baum A, Tayler SE, Singer JE (ed.). *Handbook of psychology and health*, 55-84. Hillsdale: Erlbaum, 1984.
- Drenthen AJM. Programmatische preventie in de huisartsenpraktijk. *Bijblijven* 1999; 15: 33-42 (in Dutch).
- Eaton CB, Goodwin MA, Stange KC. Direct observation of nutrition counseling in community family practice. *Am J Prev Med* 2002; 23: 174-179.
- Elder JP, Ayala GX, Harris S. Theories and intervention approaches to health-behavior change in primary care. *Am J Prev Med* 1999; 17: 275-284.
- Eley Morris S, Lean MEJ, Hankey CR, Hunter C. Who gets what treatment for obesity? A survey of GPs in Scotland. *Eur J Clin Nutr* 1999; 53: S44-S48.
- European Commission. *A Pan-EU survey on consumer attitudes to physical activity, body-weight and health*. Luxembourg: European Commission, 1998.
- Falk LW, Sobal J, Bisogni CA, Connors M, Devine CM. Managing healthy eating: Definitions, classifications, and strategies. *Health Educ Behav* 2001; 28: 425-439.
- Flocke SA, Stange KC. Direct observation and patient recall of health behaviour advice. *Prev Med* 2004; 38: 343-349.
- Fogelman Y, Vinker S, Lachter J, Biderman A, Itzhak B, Kitai E. Managing obesity: a survey of attitudes and practices among Israeli primary care physicians. *Int J Obes* 2002; 26: 1393-1397.
- Foster GD, Wadden TA, Makris AP et al. Primary care physicians' attitudes about obesity and its treatment. *Obes Res* 2003; 11: 1168-1177.
- Frank E, Wright EH, Sedula Mk, Elon LK, Baldwin G. Personal and professional nutrition-related practices of US female physicians. *Am J Clin Nutr* 2002;75:326-332.
- Fuller TL, Backett-Milburn K, Hopton JL. Healthy eating: the views of general practitioners and patients in Scotland. *Am J Clin Nutr* 2003; 77: 1043S-1047S.
- GfK. *InterActPanel*. Dongen, The Netherlands: GfK, 1999 (in Dutch).
- GfK. *Basisvragenlijst ScriptPanel*. Dongen, The Netherlands: GfK, 2000 (in Dutch).
- Girois SB, Kumanyika SK, Morabia A, Mauger E. A comparison of knowledge and attitudes about diet and health among 35- to 75-year-old adults in the United States and Geneva, Switzerland. *Am J Pub Health* 2001; 91: 418-424.
- Glanz K, Tziraki C, Albright CL, Fernandes J. Nutrition assessment and counseling practices: attitudes and interests of primary care physicians. *J Gen Int Med* 1995; 10: 89-92.
- Glanz K. Review of nutritional attitudes and counseling practices of primary care physicians. *Am J Clin Nutr* 1997; 65: 2016S-2019S.
- Glanz K, Brug J, Van Assema P. Are awareness of dietary fat intake and actual fat consumption associated? A Dutch-American comparison. *Eur J Clin Nutr* 1997; 51: 542-547.

References

- Glanz K, Rimer BK, Lewis FM. *Health behavior and health education: theory, research and practice*. San Francisco: Jossey-Bass, 2002.
- Goldberg JP. Nutrition communication in the 21st century: what are the challenges and how can we meet them? *Nutrition* 2000; 16: 644-646.
- Goldstein MG, Whitlock EP, DePue J. Multiple behavioral risk factor interventions in primary care: summary of research evidence. *Am J Prev Med* 2004; 27: 61-79.
- Green LW, Kreuter MW. *Health promotion planning: An educational and ecological approach*. California: Mayfield Publishing Company, 1999.
- Green LW, Kreuter MW. *Health promotion planning: an educational and ecological approach*. New York: McGraw Hill, 2005.
- Health Council of the Netherlands. *Voedingsnormen: calcium, vitamine D, thiamine, riboflavine, niacine, pantotheenzuur en biotine*. The Hague, The Netherlands: Health Council of the Netherlands, publication no. 2000/12 (in Dutch).
- Health Council of the Netherlands. *Voedingsnormen: energie, eiwitten, vetten en verteerbare koolhydraten*. The Hague, The Netherlands: Health Council of the Netherlands, publication no. 2001/19 (in Dutch).
- Health Council of the Netherlands. *Overgewicht en obesitas*. The Hague, the Netherlands: Health Council of the Netherlands, 2003 (in Dutch).
- Helman A. Nutrition and general practice: an Australian perspective. *Am J Clin Nutr* 1997; 65: 1939S-1942S.
- Hermus RJJ. Honderd jaar voedingswetenschappen: het ontstaan van een nieuwe discipline. In: Den Hartog AP (ed.). *De voeding van Nederland in de twintigste eeuw*. Wageningen, The Netherlands: Wageningen Pers, 2001: 19-43 (in Dutch).
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Fieren CJ, Van 't Hof MA. Nutrition guidance by primary-care physicians: perceived barriers and low involvement. *Eur J Clin Nutr* 1995; 49: 842-851.
- Hiddink GJ. *Determinants of nutrition guidance practices of primary-care physicians*. Thesis. Wageningen, The Netherlands: Wageningen Agricultural University, 1996.
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Fieren CJ, Van 't Hof MA. Consumers' expectations about nutrition guidance: the importance of primary care physicians. *Am J Clin Nutr* 1997a; 65: 1974S-1979S.
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Fieren CJ, Van 't Hof MA. Driving forces and barriers to nutrition guidance practices of Dutch primary care physicians. *J Nutr Educ* 1997b; 29: 36-41.
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Fieren CJ, Van 't Hof MA. Information sources and strategies of nutrition guidance used by primary care physicians. *Am J Clin Nutr* 1997c; 65: 1996S-2003S.
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Fieren CJ, Van 't Hof MA. Nutrition guidance by primary-care physicians: LISREL analysis improves understanding. *Prev Med* 1997d; 20: 29-36.

-
- Hiddink GJ, Hautvast JGAJ, Van Woerkum CMJ, Van 't Hof MA, Fieren CJ. Cross-sectional and longitudinal analysis of nutrition guidance by primary care physicians. *Eur J Clin Nutr* 1999; 53: S35-S43.
- Hill JO. Obesity treatment: does one size fit all? *Am J Clin Nutr* 2005; 81: 1253-1254.
- Holgado B, Martínez-González MA, de Irala-Estévez J, Gibney M, Kearney J, Martínez JA. Sources of information about diet and health in a Mediterranean country: comparison with other European member states. *Eur J Public Health* 2000; 10: 185-191.
- Holund U, Thomassen A, Boysen G et al. Importance of diet and sex in prevention of coronary artery disease, cancer, osteoporosis, and overweight or underweight: a study of attitudes and practices of Danish primary care physicians. *Am J Clin Nutr* 1997; 65: 2004S-2006S.
- Hommel GA. A stagewise rejective multiple test procedure based on a modified Bonferroni test. *Biometrika* 1988; 75: 383-386.
- Honda K. Factors underlying variation in receipt of physician advice on diet and exercise: applications of the behavioral model of health care utilization. *Am J Health Prom* 2004; 18: 370-377.
- Hulshof KFAM, Brussaard JH, Kruijenga AG, Telman J, Löwik MRH. Socio-economic status, dietary intake and 10y trends: the Dutch National Food Consumption Survey. *Eur J Clin Nutr* 2003; 57: 128-137.
- Institute for European Food Studies (IEFS). *A Pan-EU survey on consumers attitudes to food, nutrition and health: influences on food choice and sources of information on healthy eating*. Report number 2. Dublin: IEFS, 1996.
- Iszler J, Crockett S, Lytle L et al. Formative evaluation for planning nutrition interventions: results from focus groups. *J Nutr Educ* 1995; 27: 127-132.
- Jabaaij L. Contacten met de huisartspraktijk in 2000. *Huisarts & Wetenschap* 2001; 44: 589 (in Dutch).
- Jansen J, Schuit AJ, Van der Lucht F. *Tijd voor gezond gedrag. Bevordering van gezond gedrag bij specifieke groepen*. RIVM-rapport. Bilthoven, The Netherlands: Rijksinstituut voor Volksgezondheid en Milieu, 2002 (in Dutch).
- Keenan DP, AbuSabha R, Robinson NG. Consumers' understanding of the dietary guidelines for Americans: insights into the future. *Health Educ Behav* 2002; 29: 124-135.
- Kitzinger J. Qualitative research: Introducing focus groups. *BMJ* 1995; 311: 299-302.
- Kiuru P, Poskiparta M, Kettunen T, Salveto J, Liimatainen L. Advice-giving styles by Finnish nurses in dietary counseling concerning type 2 diabetes care. *J Health Comm* 2004; 9: 337-354.
- Klein Buller M, Buller DB. Physicians' communication style and patient satisfaction. *J Health Soc Behav* 1987; 28: 375-388.
- Koelen MA, Van den Ban AW. *Health education and promotion*. Wageningen, the Netherlands: Wageningen Academic Publishers, 2004.
- Kolasa KM. Strategies to enhance effectiveness of individual based nutrition communications. *Eur J Clin Nutr* 2005; 59: S24-S30.

References

- Korver O. Voeding, gezondheid en de voedingsmiddelen industrie: een ingewikkelde situatie? In: Den Hartog AP (ed.). *De voeding van Nederland in de twintigste eeuw*. Wageningen, The Netherlands: Wageningen Pers, 2001: 71-83 (in Dutch).
- Kourhis-Blazos A, Setter LT, Wahlqvist ML. Nutrition and health informatics. *Nutr Res* 2001; 21: 269-278.
- Krebs-Smith SM, Heimendinger J, Patterson BH, Subar AF, Kessler R, Pivonka E. Psychosocial factors associated with fruit and vegetable consumption. *Am J Health Prom* 1995; 10: 98-104.
- Kreuter MW, Skinner CS. Tailoring: What's in a name. *Health Educ Res* 2000; 15:1-4.
- Krinke UB. Nutrition information topic and format preferences of older adults. *Soc Nutr Ed* 1990; 22: 292-297.
- Kristal AR, Glanz K, Curry S, Patterson RE. How can stages of change be best used in dietary interventions? *J Am Diet Assoc* 1999; 99: 679-684.
- Krueger RA. *Focus groups. A practical guide for applied research*. Newbury Park: SAGE, 1988.
- Kunkel ME, Cody MM, Davis RJ, Wheeler FC. Nutrition information sources used by South Carolina adults. *J Am Diet Assoc* 1986; 3: 371-372.
- Kushner RF. Barriers to providing nutrition counseling by physicians: a survey of primary care physicians. *Prev Med* 1995; 24:546-552.
- Lappalainen R, Kearney J, Gibney M. A Pan European survey of consumer attitudes to food, nutrition and health: an overview. *Food Qual Pref* 1998; 9: 467-478.
- Lawson MT. Nurse practitioner and physician communication styles. *Appl Nurs Res* 2002; 15: 60-66.
- Lazarus K. Nutrition practices of family physicians after education by a physician nutrition specialist. *Am J Clin Nutr* 1997; 65: 2007S-2009S.
- Lechner L, Brug J, De Vries H. Misconception of fruit and vegetable consumption: differences between objective and subjective estimation of intake. *J Nutr Educ* 1997; 29: 313-330.
- Linck H. *Op weg naar een effectievere voedingsinteractie tussen huisarts en patiënt. Toepassing van voorlichtingskundige theorieën bij de voedingsinteractie tussen huisarts en patiënt. Ontwikkeling van een aandachtspuntenlijst voor kwalitatief onderzoek op basis van deze voorlichtingskundige theorieën. Afstudeerscriptie*. Wageningen, The Netherlands: Communicatie en Innovatie Studies, 2002 (in Dutch).
- Lorig K. Partnerships between expert patients and physicians. *Lancet* 2002; 359: 814-815.
- Maiburg BHJ, Rethans J-JE, Schuwirth LWT, Mathus-Vliegen LMH, Van Ree JW. Controlled trial of effect of computer-based nutrition course on knowledge and practice of general practitioner trainees. *Am J Clin Nutr* 2003; 77: 1019S-1024S.
- Maiburg BHJ, J-J E Rethans, Van Ree JW. GPs' needs for practice-oriented nutrition education; a Delphi study among Dutch GPs. *Fam Pract* 2004; 21: 425-428.
- Makrides L, Veinot PL, Richard J, Allen MJ. Primary care physicians and coronary heart disease prevention: a practice model. *Pat Educ Couns* 1997; 32: 207-217.

-
- Malone M, Harris R, Hooker R, Tucker T, Tanna N, Honnor S. Health and the Internet – changing boundaries in primary care. *Fam Pract* 2004; 21: 189-191.
- Mant D. Effectiveness of dietary intervention in general practice. *Am J Clin Nutr* 1997; 65: 1933S-1938S.
- Mathus-Vliegen EMH. Overgewicht. II. Determinanten van overgewicht en strategieën voor preventie. *Ned Tijds Geneesk* 1998; 142: 1989-1995 (in Dutch).
- McAvoy BR, Kaner EFS, Lock CA, Heather N, Gilvarry E. Our Healthier Nation: are general practitioners willing and able to deliver? A survey of attitudes to and involvement with health promotion and lifestyle counselling. *Br J Gen Pract* 1999; 49: 187-190.
- Medeiros L, Russell W, Shipp R et al. Nutrition knowledge as influenced by source of nutrition information. *Nutr Res* 1991; 11: 979-988.
- Meertens R, Schaalma H, Brug J, De Vries N. Determinanten van gedrag. In: Brug J, Schaalma H, Kok G, Meertens RM, Van der Molen HT (ed.). *Gezondheidsvoorlichting en gedragsverandering. Een planmatige aanpak*. Assen, The Netherlands: Van Gorcum & Comp, 2001: 55-72 (in Dutch).
- Mercer SL, Green LW, Rosenthal AC, Husten CG, Kettel Khan L, Dietz WH. Possible lessons from the tobacco experience for obesity control. *Am J Clin Nutr* 2003; 77: 1073S-1082S.
- Miles S, Frewer LJ. Investigating specific concerns about different food hazards. *Food Qual Pref* 2001; 12: 47-61.
- Mokdad AH, Ford ES, Bowman et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA* 2003; 289: 76-79.
- Moore H, Adamson AJ, Gill T, Waine C. Nutrition and health care agenda: a primary care perspective. *Fam Pract* 2000; 17: 197-200.
- Moore H, Adamson AJ. Nutrition interventions by primary care staff: a survey of involvement, knowledge and attitude. *Publ Health Nutr* 2002; 5: 531-536.
- Morgan DL. *Successful focus groups: advancing the state of the art*. Newbury Park: SAGE, 1993.
- National Heart, Lung, and Blood Institute, Obesity Education Initiative Expert Panel. Clinical guidelines in identification, evaluation and treatment of overweight and obesity in adults: the evidence report. *Obes Res* 1998; 6: 51S-209S.
- Nicholas L, Pond D, Roberts DCK. Dietitian-General Practitioner interface: a pilot study on what influences the provision of effective patient nutrition management. *Am J Clin Nutr* 2003; 77: 1039S-1042S.
- Nicholas L, Pond D, Roberts DCK. The effectiveness of nutrition counselling by Australian general practitioners. *Eur J Clin Nutr* 2005; 59: S140-S146.
- Norman P, Bennett P. Health locus of control. In: Conner M, Norman P (ed.). *Predicting health behavior : research and practice with social cognition models*. Buckingham: Open University Press, 1996: 62-94.
- Nowak M. The weight-conscious adolescent: body image, food intake, and weight-related behavior. *J Adol Health* 1998; 23: 389-398.

References

- Nutrition Center. *Zo eet Nederland: resultaten van de Voedselconsumptiepeiling 1997-1998*. The Hague, The Netherlands: Nutrition Center, 1998 (in Dutch).
- Nutrition Center. *Top 10 voor lekker en gezond*. The Hague, The Netherlands: Nutrition Center; 2002 (in Dutch).
- Nutrition Council of the Netherlands. *Adviesrichtlijnen goede voeding*. The Hague, The Netherlands: Nutrition Council of the Netherlands, 1986 (in Dutch).
- Oenema A, Brug J. Feedback strategies to raise awareness of personal dietary intake: results of a randomized controlled trial. *Prev Med* 2003; 36: 429-439.
- Ong LML, De Haes JCJM, Hoos AM, Lammes FB. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995; 40: 903-918.
- Oude Ophuis PAM . Measuring health orientation and health consciousness as determinants of food choice behaviour. In: Avlonitis GJ (ed.). *Marketing through and practice in the 1990s*, Proceedings of the XVIII Annual Conference of the European Marketing Academy; 1989: 1723-1725.
- Pavlekovic G, Brborovic O. Empowering general practitioners in nutrition communication: individual-based nutrition communication strategies in Croatia. *Eur J Clin Nutr* 2005; 59: S40-S46.
- Petty RE, Cacioppo JT. The elaboration likelihood model of persuasion. *Adv Exp Soc Ps* 1986; 19: 123-205.
- Pieterse ME, Seydel ER, De Vries H, Mudde AN, Kok GJ. Effectiveness of a minimal contact smoking cessation program for Dutch general practitioners: a randomized controlled trial. *Prev Med* 2001; 32: 182-190.
- Probart CK, Davis LG, Hibbard JH, Kime RE. Factors that influence the elderly to use traditional or nontraditional nutrition information sources. *J Am Diet Assoc* 1989; 89: 1758-1762.
- Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. *Prog Behav Mod* 1992; 28: 184-218.
- Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Prom* 1997; 12: 38-48.
- Qualitative Solutions and Research International (QSR). January 2002. Internet: <http://www.qsrinternational.com/products/n4.html> (accessed 30 January 2002).
- Raab CA, Bock MA, Carpenter K et al. Targeting messages to supplement users. *J Am Diet Assoc* 1989; 89: 545-546.
- Raad voor Volksgezondheid en Zorg (RVZ). *E-health in zicht*. Zoetermeer, The Netherlands: RVZ, 2002 (in Dutch).
- Raaijmakers T, Vaandrager L. Gezonde voeding. In: Keijsers FEM, Vaandrager L (ed.). *Gezond leven: stand van zaken en voorstel voor programmering*. The Hague, The Netherlands: ZorgOnderzoek Nederland, 2000: 75-95 (in Dutch).
- Richards D, Mitchell G. GPs and nutrition: what they want and how they want it. A GP nutrition education project. *Aust J Nutr Diet* 2001; 58: 56-59.

-
- Richards L. *QSR NUD*IST Introductory handbook*. Melbourne, Australia: Qualitative Solutions and Research Pty Ltd, 1998.
- Richards TJ, Richards L. Using computers in qualitative research. In: Denzin NK, Lincoln YS (ed.). *Collecting and interpreting qualitative materials*. Thousand Oaks: SAGE, 1998: 211-245.
- Roininen K, Lähteenmäki L, Tuorila H. Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite* 1999; 33: 71-88.
- Roter DL, Stewart M, Putnam SM, Lipkin M, Stiles W, Inui TS. Communication patterns of primary care physicians. *JAMA* 1997; 277: 350-356.
- Rozin P, Vollmecke TA. Food likes and dislikes. *Annual Rev Nutr* 1986; 6: 433-456.
- Rozin P, Fischler C, Imada S, Sarubin A, Wrzesniewski A. Attitudes to food and the role of food in life in the U.S.A., Japan, Flemish Belgium and France: possible implications for the diet-health debate. *Appetite* 1999; 33: 163-180.
- Sapp SG, Jensen HH. Reliability and validity of nutrition knowledge and diet-health awareness tests developed from the 1989-1991 diet and health knowledge surveys. *J Nutr Educ* 1997; 29: 63-72.
- Say RE, Thomson R. The importance of patient preferences in treatment decisions – challenges for doctors. *BMJ* 2003; 327: 542-545.
- Schaalma H, Meertens R, Kok G, Brug J, Hospers H. Theorieën en methodieken van verandering. In: Brug J, Schaalma H, Kok G, Meertens RM, Van der Molen HT (ed.). *Gezondheidsvoorlichting en gedragsverandering: een planmatige aanpak*. Assen, The Netherlands: Van Gorcum, 2001: 89-117 (in Dutch).
- Schoen C, Osborn R, Huynh PT et al. Primary care and health system performance: adults' experiences in five countries. *Health Affairs* 2004; 4: 487-503.
- Scott JG, Cohen D, DiCicco-Bloom B et al. Speaking of weight: how patients and primary care clinicians initiate weight loss counseling. *Prev Med* 2004; 38: 819-827.
- Serra-Majem LL, Calvo JR, Male ML, Ribas L, Lainez P. Population attitudes towards changing dietary habits and reliance on general practitioners in Spain. *Eur J Clin Nutr* 1999; 53: S58-S61.
- Shaw J, Baker M. 'Expert patient' – dream or nightmare? The concept of a well informed patient is welcome, but a new name is needed. *BMJ* 2004; 328: 723-724.
- Shepherd R. Dietary salt intake. *Food Nutr Sc* 1985; 96: 10-15.
- Shim Y, Variyam JN, Blaylock J. Many Americans falsely optimistic about their diets. *Food Rev* 2000; 23: 44-50.
- Silvester K, Horwath C. The nutrition information sources of elderly New Zealanders. *J Nutr Eld* 1991; 10: 45-53.
- Simkin-Silverman LR, Gleason KA, King WC et al. Predictors of weight control advice in primary care practices: patient health and psychosocial characteristics. *Prev Med* 2005; 40: 71-82.
- Slovic P. Perception of risk. *Science* 1987; 236: 280-285.

References

- Stichting Maatschappij en Onderneming (SMO). *Voeding en voorlichting. Resultaten van een onderzoek onder 628 personen*. The Hague, the Netherlands: SMO, 1991 (in Dutch).
- Soltesz KS, Price JH, Johnson LW, Tellijskann SK. Family physicians' views of the Preventive Services Task Force recommendations regarding nutrition communication. *Arch Fam Med* 1995a; 4: 589-593.
- Soltesz KS, Price JH, Johnson LW, Tellijskann SK. Perceptions and practices of family physicians regarding diet and cancer. *Am J Prev Med* 1995b; 11: 197-204.
- Street RL. Gender differences in health care provider-patient communication: are they due to style, stereotype, or accommodation? *Pat Educ Couns* 2002; 48: 201-206.
- SWOKA. *Vijfde meting van de SWOKA voedingsmonitor*. Leiden, the Netherlands: SWOKA, 1999 (in Dutch).
- Talip W, Stein NP, Visser M, Charlton KE, Temple N. Development and validation of a knowledge test for health professionals regarding lifestyle modification. *Nutr* 2003; 19: 760-766.
- Te Molder H. Communicatie in de informatiemaatschappij. In: Van Woerkum CMJ, Van Meegeren P (ed.). *Basisboek communicatie en verandering*. Amsterdam, the Netherlands: Uitgeverij Boom, 1999.
- Ter Telgte YM, Van Binsbergen JJ, Van Dillen SME, Hiddink GJ. Informatie over voeding: de toegevoegde waarde van internet. *Patient Care* 2004; 31: 673-676 (in Dutch).
- Thomas RJ, Kottke TE, Brekke MJ et al. Attempts at changing dietary and exercise habits to reduce risk of cardiovascular disease: who's doing what in the community? *Prev Cardiol* 2002; 5: 102-108.
- Truswell AS (ed.). Nutritional attitudes and practices of primary care physicians. Proceedings of a Symposium held in Heelsum, The Netherlands, December 11-13, 1995. *Am J Clin Nutr* 1997; 65: 1927S-2022S.
- Truswell AS (ed.). International workshop 'Family doctors and patients: is effective nutrition interaction possible?' Proceedings of a Symposium held in Heelsum, The Netherlands, December 14-16, 1998. *Eur J Clin Nutr* 1999; 53: S1-S114.
- Truswell AS, Hiddink GJ, Blom J. Nutrition guidance by family doctors in a changing world: problems, opportunities and future possibilities. *Am J Clin Nutr* 2003; 77: 1089S-1092S.
- Truswell AS (ed.). Empowering family doctors and patients in nutrition communication. Proceedings of the Fourth Heelsum International Workshop. Heelsum, The Netherlands, December 13-15, 2004. *Eur J Clin Nutr* 2005; 59: S1-S196.
- Truswell AS, Hiddink GJ, Van Binsbergen JJ, Kok F, Van Weel C. Empowering family doctors and patients in nutrition communication. *Eur J Clin Nutr* 2005; 59: S1-S3.
- US Preventive Services Task Force. *Clinician's handbook of preventive services*. Washington, DC: US Public Health Services, International Medical Publishing, Inc, 1998: 400-412.
- USDA/USDHHS (US Department of Agriculture, US Department of Health and Human Services). *Nutrition and your health: dietary guidelines for Americans*. Washington, DC: USDA, DHHS, 2000.

-
- USDHHS (US Department of Health and Human Services). *Healthy people 2010. With understanding and improving health and objectives for improving health*. Washington, DC: US Government Printing Office, 2000.
- Vaandrager HW, Koelen MA. Consumer involvement in nutritional issues: the role of information. *Am J Clin Nutr* 1997; 65: 1980S-1984S.
- Van Assema PT, Kok GJ, De Leeuw E. Gedragsbeïnvloeding. In: Ten Hoor F, Asmoredjo-Kirchmann MET (ed.). *Voedingsbericht*. The Hague, The Netherlands: Staat Drukkerij en Uitgeverij, 1990: 359-393 (in Dutch).
- Van Assema PT. Het focusgroep-interview: een stappenplan. *Tijds Soc Geneesk* 1992a; 7: 431-437 (in Dutch).
- Van Assema PT. Kanker-preventieonderzoek met focusgroepinterviews. *Gedrag en Gezondheid* 1992b; 20: 10-21 (in Dutch).
- Van Assema P, Brug J, Lechner L. Voedingsgedrag en de primaire preventie van kanker: de promotie van groente en fruit. *Tijds Soc Geneesk* 2001; 79: 346-355 (in Dutch).
- Van Binsbergen JJ, Ocké MC. Voedingsadviezen in de huisartsenpraktijk. In: Van Binsbergen JJ, Kalmijn S, Ocké MC (ed.). *Voeding en chronische ziekten*. Utrecht, the Netherlands: Van der Wees, 2001: 21-27 (in Dutch).
- Van Binsbergen JJ, Drenthen AJM. Patient information letters on nutrition: development and implementation. *Am J Clin Nutr* 2003; 77: 1035S-1038S.
- Van den Brink-Muinen A, Van Dulmen AM, Bensing JM et al. *Eurocommunication II: a comparative study between countries in Central- and Western-Europe on doctor-patient communication in general practice*. Utrecht, the Netherlands: NIVEL, 2003.
- Van den Brink-Muinen A, Van Dulmen AM, Schellevis FG, Bensing JM (ed.). *Tweede Nationale Studie naar ziekten en verrichtingen in de huisartspraktijk: Oog voor communicatie: huisarts-patiënt communicatie in Nederland*. Utrecht, the Netherlands: Nivel, 2004 (in Dutch).
- Van den Hogen E, Van Assema P, Van der Horst P. Afstemming tussen huisartsen en diëtisten op het gebied van voedingsvoorlichting en dieetadvisering. *Ned Tijds Diët* 1996; 51: 102-107 (in Dutch).
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Understanding nutrition communication between health professionals and consumers: development of a model for nutrition awareness based on qualitative consumer research. *Am J Clin Nutr* 2003; 77: 1065S-1072S.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Perceived relevance and information needs regarding food topics and preferred information sources among Dutch adults: results of a quantitative consumer study. *Eur J Clin Nutr* 2004; 58: 1306-1313.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Exploration of possible correlates of nutrition awareness and the relationship with nutrition-related behaviours: results of a quantitative consumer study. 2005a, submitted for publication.

References

- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Identification of nutrition communication styles and strategies: a qualitative study among Dutch GPs. 2005b, submitted for publication.
- Van Dillen SME, Hiddink GJ, Koelen MA, Van Woerkum CMJ. Nutrition communication styles of family doctors: results of quantitative research. *Eur J Clin Nutr* 2005c; 59: S47-S56.
- Van Dusseldorp M, Meeuws H, Van Kessel H, Hendriks L, Chin L, Bakx C. Frequentie van voedingsvragen op het spreekuur van de huisarts. *Ned Tijds Geneesk* 1988; 132: 2325-2328 (in Dutch).
- Van Duyn MAS, Kristal AR, Dodd K, Campbell MK, Subar AF, Stables G, Nebeling L, Glanz K. Association of awareness, intrapersonal and interpersonal factors and stage of dietary change with fruit and vegetable consumption: a national survey. *Am J Health Prom* 2001; 16: 69-78.
- Van Gaasbeek T, Hansman H. Weinig effect van gezondheidsbesef ouders op snoepgedrag kinderen. *Voeding Nu* 2000; 12: 9-11 (in Dutch).
- Van Kreijl CF, Knaap AGAC. *Ons eten gemeten. Gezonde voeding en veilig voedsel in Nederland*. Bilthoven, The Netherlands: RIVM, 2004 (in Dutch).
- Van Oers JAM. *Gezondheid op koers? Volksgezondheid Toekomst Verkenning 2002*. Houten, the Netherlands: Bohn Stafleu van Loghum, 2002 (in Dutch).
- Van Sluijs EMF, Van Poppel MNM, Stalman WAB, Van Mechelen W. Feasibility and acceptability of a physical activity programme in general practice. *Fam Pract* 2004a; 21: 429-436.
- Van Sluijs EMF, Van Poppel MNM, Van Mechelen W. Stage-based lifestyle interventions in primary care: are they effective? *Am J Prev Med* 2004b; 26: 330-343.
- Van Weel C. Morbidity in family medicine: the potential for individual nutritional counseling, an analysis from the Nijmegen Continuous Morbidity Registration. *Am J Clin Nutr* 1997; 65: 1928S-1932S.
- Van Weel C. Dietary advice in family medicine. *Am J Clin Nutr* 2003; 77: 1008S-1010S.
- Van Woerkum CMJ. Nutrition guidance by primary care physicians. *Eur J Clin Nutr* 1999; 53: S19-21.
- Van Woerkum CMJ. The Internet and primary care physicians: coping with different expectations. *Am J Clin Nutr* 2003; 77: 1016S-1018S.
- Visscher TLS, Seidell JC. Gevaarlijk dik: mensen met obesitas lopen grote risico's. *Medisch Contact* 2001; 56: 1570-1572 (in Dutch).
- Visscher TLS, Kromhout D, Seidell JC. Long-term and recent time trends in the prevalence of obesity among Dutch men and women. *Int J Obes* 2002; 26: 1409-1416.
- Volksgezondheid, Welzijn en Sport, Ministerie van (VWS). *Beleidsontwerp preventie*. The Hague, The Netherlands: VWS, 2004 (in Dutch).
- Walker WA. Innovative teaching strategies for training physicians in clinical nutrition: an overview. *J Nutr* 2003; 133: 541S-543S.
- Wallston BS, Wallston KA. Locus of control and health: a review of the literature. *Health Educ Mon* 1978; 6: 107-117.

-
- Weinstein ND. The precaution adoption process. *Health Psych* 1988; 7: 355-386.
- Wester F. Analyse van kwalitatief onderzoeksmateriaal. *Huisarts & Wetenschap* 2004; 47: 565-570 (in Dutch).
- Wiesemann A. Nutrition counseling in German general practice: a holistic approach. *Am J Clin Nutr* 1997; 65: 1957S-1962S.
- Willett WC. Diet and health: what should we eat? *Science* 1994; 246: 532-537.
- World Health Organisation (WHO). *Obesity: preventing and managing the global epidemic*. Geneva: WHO, 2000.
- Worsley A. Perceived reliability of sources of health information. *Health Educ Res* 1989; 4: 367-376.
- Worsley A, Worsley AJ. New Zealand general practitioners' nutrition opinions. *Austr J Nutr Diet* 1991; 48: 7-10.
- Worsley A. How to improve the impact of nutrition guidance by general physicians: public health versus individual patient? *Eur J Clin Nutr* 1999; 53: S101-S107.
- Zimbardo PG, Leippe MR. Making persuasion last: the persistence and behavioral consequences of attitude change. In: Zimbardo PG, Leippe MR (ed.). *The psychology of attitude change and social influence*. Boston Massachusetts: McGraw-Hill, 1991: 168-201.
- Zimmerman GL, Olsen CG, Bosworth MF. A 'stages of change' approach to helping patients change behaviour. *Am Fam Phys* 2000; 61: 1409-1416.

SUMMARY

Family doctors are being more and more confronted with patients who suffer from nutrition-related diseases, such as coronary heart disease, type 2 diabetes and obesity. Good communication is essential in the treatment of their diseases, but it is also important to provide sound nutrition advice to healthy patients. Patients' expectations regarding nutrition communication clash with family doctors' expectations regarding nutrition communication. As a result, nutrition communication between family doctors and patients sometimes goes wrong.

The main objective of the study presented in this thesis is to provide recommendations for more effective nutrition interaction between family doctor and patient. To achieve this main objective, we chose a two-sided approach, taking into account the perspective of patients and the perspective of family doctors. Firstly, the communicative characteristics of patients regarding nutrition communication through family doctors were explored and assessed. Secondly, the communicative characteristics of family doctors regarding nutrition communication towards patients were explored and assessed. Thirdly, both the perspective of patients and the perspective of family doctors were integrated in order to provide recommendations for more effective nutrition interaction.

Chapter 2 showed the results of a literature review about nutrition communication in general practice. This review included publications of the past ten years. As a result, we are better able to situate the results of our own empirical studies in order to provide contemporary recommendations for more effective nutrition communication in general practice. The review showed how often family doctors actually discussed nutrition in general practice. Moreover, information was collected about studies that assessed different aspects of the patients' perspective and family doctors' perspective.

In Chapter 3 the results of a qualitative study among Dutch patients were discussed. By means of focus groups and in-depth interviews, food associations, conversation topics, interest in food topics and information sources were mapped. These results are interesting for family doctors, dieticians, nutrition education organisations and other professionals. Based on the results, a hypothetical model for nutrition awareness was developed, including psycho-social and socio-demographic variables. With the aid of a computer program for qualitative data analysis, some themes were constructed, such as concerns about food safety and concerns about weight. The chapter ended with some recommendations for more effective nutrition communication.

Summary

Chapter 4 presented the results of a face-to-face, interview-assisted questionnaire in which Dutch adults ranked food topics in order of importance. Despite high-perceived relevance of food topics regarding dietary guidelines, most respondents indicated that they did not want more information on these topics. There seems to be a discrepancy between perceived relevance and information needs regarding food topics. Differences in information needs regarding food topics between subgroups based on gender, age, perceived weight and socio-economic status were analysed. Therefore, we recommended the tailoring of predominant information needs by preferred information source; for example, family doctors should tailor the information need regarding losing weight to the subgroup of overweight people. With respect to sports and nutrition, lowering cholesterol, carbohydrates and food composition, interested subgroups should also receive tailored information. We considered a population-wide strategy useful for other groups and food topics, in situations where the target groups were not yet interested in a particular topic. Furthermore, we stressed the importance of information on demand.

In Chapter 5 the hypothetical model for nutrition awareness was tested in the same study among patients. The most important psycho-social variables for nutrition awareness were involvement with nutrition, health awareness, association with healthy food, perceived relevance of eating less fat, association with necessity, perceived attributes of independent organisations, and perceived relevance of vitamins. Socio-demographic variables added little to the model. Our model was able to explain nutrition awareness rather well (total explained variance 54%). Moreover, patients with low nutrition awareness perceived family doctors as more suitable nutrition information sources than did patients with high nutrition awareness.

In Chapter 6 the results of focus groups with family doctors were discussed. Five nutrition communication styles were identified: informational, reference, motivational, confrontational and holistic. An informational nutrition communication means providing information about nutrition and health. A reference style stands for calling on other health professionals to deal with nutrition problems. A motivational style means guidance in dietary change. A confrontational style stands for warning about nutrition problems related to a health complaint. A holistic style stands for involving several aspects of being part of living circumstances. Subsequently, a hypothetical model for nutrition communication style was developed, including psycho-social and socio-demographic variables.

In Chapter 7 the hypothetical model for nutrition communication style was tested with the aid of a questionnaire. The most important psycho-social variables for a motivational nutrition communication style were task perception of prevention, information seeking behaviour regarding

nutrition, patient's complaint hypertension, interest in nutrition, task perception of nutrition issues, perception of nutrition and physical activity, and initiative of family doctor to discuss nutrition (total explained variance 49%). Other nutrition communication styles showed explained variances up to 57%. Socio-demographic variables did not add to the model. It appeared that family doctors use a combination of nutrition communication styles, depending on the situation. If family doctors communicated about nutrition, they selected any of the five nutrition communication styles. If they communicated about overweight, they picked either the confrontational or motivational style.

We conclude that patients expect nutrition communication from their family doctors. Moreover, patients perceive family doctors as the best sources for information about health-related food topics, such as losing weight and lowering cholesterol. In addition, patients with low nutrition awareness perceive family doctors as the best nutrition information source. However, family doctors provide mainly basic nutrition information to their patients. They use a combination of nutrition communication styles, depending on the situation. Finally, family doctors have a low self-efficacy to communicate about overweight.

With respect to future research, we recommend the development of a practical tool for family doctors to communicate with overweight patients. With respect to practice, it is necessary that family doctors become convinced that they are highly esteemed by their patients, also regarding nutrition communication. It is strongly recommended that family doctors provide tailored information to interested subgroups. We also advise the provision of information on demand. More attention should be devoted to raising nutrition awareness among patients. Moreover, we advise that family doctors realise that they have different nutrition communication styles, and that these can be applied in different situations.

SAMENVATTING

Huisartsen worden steeds vaker geconfronteerd met patiënten die voedingsgerelateerde aandoeningen hebben, zoals hart- en vaatziekten, type 2 diabetes and obesitas. Goede communicatie is belangrijk bij de behandeling van deze ziekten, maar het is ook belangrijk om een gedegen voedingsadvies aan gezonde patiënten te geven. De verwachtingen van patiënten ten opzichte van voedingscommunicatie botsen met de verwachtingen die huisartsen hierover hebben. Het gevolg is dat de voedingscommunicatie niet altijd soepel verloopt.

De hoofddoelstelling van het onderzoek dat besproken wordt in dit proefschrift is het formuleren van aanbevelingen voor een meer effectieve voedingscommunicatie tussen huisartsen en patiënten. Om deze hoofddoelstelling te bereiken, hebben we voor een tweezijdige benadering gekozen, waarbij zowel het perspectief van patiënten als het perspectief van huisartsen in beschouwing zijn genomen. Allereerst zijn de communicatieve kenmerken van patiënten met betrekking tot voedingscommunicatie door huisartsen verkend en gemeten. Ten tweede zijn de communicatieve kenmerken van huisartsen met betrekking tot voedingscommunicatie aan patiënten verkend en gemeten. Ten derde zijn zowel het perspectief van patiënten als het perspectief van huisartsen geïntegreerd met het doel om aanbevelingen te formuleren voor een effectievere voedingsinteractie.

Hoofdstuk 2 liet de resultaten zien van een literatuurstudie naar voedingscommunicatie in de huisartspraktijk. Deze review bevatte publicaties van de afgelopen tien jaar. Hierdoor zijn we beter in staat om de resultaten van onze onderzoeken te plaatsen om vervolgens hedendaagse aanbevelingen voor effectievere voedingscommunicatie in de huisartspraktijk te doen. De review liet zien hoe vaak nu daadwerkelijk gesproken werd over voeding in de huisartspraktijk. Bovendien werd informatie verzameld over studies die verschillende aspecten van het perspectief van patiënten dan wel van huisartsen ten opzichte van voedingscommunicatie gemeten hebben.

In hoofdstuk 3 werden de resultaten besproken van een kwalitatief onderzoek onder Nederlandse patiënten. Door middel van focusgroep- en diepte-interviews werd in kaart gebracht wat mensen van voeding vinden, waar ze over praten, waar ze graag meer over willen weten en waar ze die informatie vandaan halen. Deze gegevens zijn interessant voor huisartsen, diëtisten, voedingsvoorlichtingsorganisaties en andere professionals. Op basis van de resultaten werd een hypothetisch model voor voedingsbewustzijn ontwikkeld, inclusief psycho-sociale en socio-demografische variabelen. Met behulp van een computerprogramma voor kwalitatieve data-analyse werden een aantal thema's geconstrueerd, zoals ongerustheid over voedselveiligheid en

bezorgdheid over gewicht. Het hoofdstuk eindigde met een aantal aanbevelingen voor een effectievere voedingscommunicatie.

In hoofdstuk 4 werden de resultaten van face-to-face interviews met behulp van een vragenlijst besproken, waarin Nederlandse patiënten voedingsonderwerpen rangschikten naar mate van belangrijkheid. Ondanks het feit dat men voedingsonderwerpen met betrekking tot de richtlijnen goede voeding waarnam als zeer relevant, gaven de meeste respondenten aan dat ze niet meer informatie wensten over deze onderwerpen. Er lijkt een discrepantie op te treden tussen persoonlijke relevantie en informatiebehoefte. Verschillen in informatiebehoefte tussen subgroepen gebaseerd op geslacht, leeftijd, waargenomen gewicht en sociaal-economische status werden geanalyseerd. Daarom werd aanbevolen dat voorlichting op maat door de geprefereerde informatiebronnen gegeven zou moeten worden over de dominante informatiebehoefte, bijvoorbeeld huisartsen zouden voorlichting op maat moeten geven over de informatiebehoefte gezond afvallen aan de subgroep van mensen met overgewicht. Met betrekking tot sport en voeding, cholesterolverlaging, koolhydraten en samenstelling van voeding, zouden geïnteresseerde subgroepen ook voorlichting op maat moeten ontvangen. Een populatiebrede strategie werd zinvol gezien voor andere groepen en voedingsonderwerpen, in situaties waarin de doelgroepen nog niet geïnteresseerd zijn in informatie over een bepaald onderwerp. Bovendien werd het belang van informatie op verzoek benadrukt.

In hoofdstuk 5 werd in dezelfde studie onder patiënten het hypothetisch model voor voedingsbewustzijn getoetst. De meest belangrijke psycho-sociale variabelen voor voedingsbewustzijn waren interesse in voeding, gezondheidsbewustzijn, associatie ten aanzien van gezond eten, waargenomen relevantie van het voedingsonderwerp eten met minder vet, associatie ten aanzien van noodzakelijkheid, waargenomen geschiktheid van onafhankelijke organisaties als voedingsinformatiebron, en waargenomen relevantie van het voedingsonderwerp vitamines. De socio-demografische variabelen geslacht en leeftijd voegden nog iets toe aan het model. Ons model bleek in staat om voedingsbewustzijn goed toe voorspellen (totaal verklaarde variantie 54%). Bovendien vonden patiënten met een laag voedingsbewustzijn huisartsen meer geschikt als informatiebron over voeding dan patiënten met een hoog voedingsbewustzijn.

In hoofdstuk 6 werden de resultaten besproken van focusgroep interviews met huisartsen. Er werden vijf voedingscommunicatiestijlen geïdentificeerd: informerend, verwijzend, motiverend, confronterend en holistisch. Een informerende voedingscommunicatiestijl betekent het verschaffen van informatie over voeding en gezondheid. Een verwijzende stijl staat voor het inschakelen van andere gezondheidsprofessionals bij een voedingsprobleem. Een motiverende stijl houdt in dat

begeleiding aangeboden wordt bij verandering van het voedingsgedrag. Een confronterende stijl staat voor het waarschuwen over voedingsproblemen gerelateerd aan een gezondheidsklacht. Een holistische stijl tenslotte betekent het betrekken van verschillende aspecten die deel uit maken van de leefomstandigheden. Vervolgens werd een hypothetisch model voor voedingscommunicatiestijl ontwikkeld, bestaande uit psychosociale en socio-demografische variabelen.

In hoofdstuk 7 werd het hypothetisch model voor voedingscommunicatiestijl getoetst met behulp van een vragenlijst. De belangrijkste psychosociale variabelen voor de motiverende voedingscommunicatiestijl waren taakopvatting ten opzichte van preventie, informatiezoekgedrag ten aanzien van voeding, patiënt met klacht hypertensie, interesse in voeding, taakopvatting ten aanzien van voedingszaken, perceptie over de combinatie voeding en lichaamsbeweging, en het initiatief van de huisarts om voeding te bespreken (totaal verklaarde variantie 49%). De andere voedingscommunicatiestijlen konden tot 57% verklaard worden. Socio-demografische variabelen voegden niets toe. Het bleek dat huisartsen een combinatie van voedingscommunicatiestijlen gebruiken, afhankelijk van de situatie. Als huisartsen over voeding communiceren, dan kunnen ze elk van de vijf stijlen toepassen. Als ze communiceren over overgewicht, dan kiezen ze voor de confronterende of motiverende stijl.

We concluderen dat patiënten voedingscommunicatie verwachten van hun huisartsen. Daarnaast zien patiënten huisartsen als de beste bron voor informatie over gezondheidgerelateerde voedingsonderwerpen, zoals gezond afvallen en cholesterolverlaging. Bovendien nemen patiënten met een laag voedingsbewustzijn huisartsen waar als de beste voedingsinformatiebron. Huisartsen echter geven hoofdzakelijk basale voedingsinformatie aan hun patiënten. Ze gebruiken een combinatie van voedingscommunicatiestijlen, afhankelijk van de situatie. Tenslotte hebben huisartsen een lage eigen-effectiviteit om over overgewicht te communiceren.

Wat betreft vervolgonderzoek, wordt aanbevolen om een praktisch hulpmiddel voor huisartsen te ontwikkelen die ze kunnen gebruiken om te communiceren met patiënten met overgewicht. In de praktijk is het noodzakelijk dat huisartsen overtuigd worden van het feit dat ze zo hoog in aanzien staan bij hun patiënten, ook wat betreft het geven van voedingscommunicatie. Het is sterk aan te bevelen dat huisartsen voorlichting op maat geven aan geïnteresseerde subgroepen. We adviseren ook om rekening te houden met informatie op verzoek. Meer aandacht zou ook besteed moeten worden aan bevorderen van het voedingsbewustzijn van patiënten. Bovendien adviseren we dat huisartsen zich realiseren dat ze verschillende voedingscommunicatiestijlen kunnen toepassen, afhankelijk van de situatie.

DANKWOORD

Sommige mensen zullen wel vreemd opkijken bij het verschijnen van dit proefschrift, want ik riep altijd dat ik geen AIO wilde worden. Toch stapte ik er in om me zo maar liefst vier jaar op één onderwerp te kunnen richten. Al met al duurde dit toch niet zo lang en nu is het boek dan toch echt af. Achteraf gezien kan ik nu tenminste één reden bedenken waarom ik blij ben dat ik dit promotieonderzoek met succes heb afgerond. Tijd om een aantal mensen te bedanken.

Gert Jan, ook al was je maar één dag per week fysiek aanwezig in Wageningen, je nam altijd ruim de tijd voor me. Elke week was je weer enthousiast over wat ik nu weer ontdekt had. Ik heb veel geleerd van je geleerd over het verrichten van huisartsenonderzoek.

Cees, dank voor het vasthouden van de rode draad. Tot twee keer toe heb je gezorgd voor een pas op de plaats, als ik weer eens te hard van stapel liep met het kwantitatief onderzoek.

Maria, wat ben ik blij dat jij mij geholpen hebt met het interpreteren van de gegevensbestanden. Fijntjes liet je me er aan herinneren, dat ook een niet significant resultaat belangrijk is.

Kees, jij was steeds weer in staat met een voedingsbril naar mijn resultaten te kijken. Hierdoor ben ik ook de lekkere en sociale aspecten van eten niet uit het oog verloren.

Lianne, Kamieke, Linda, Gwyneth van GfK, ik heb prettig met jullie samengewerkt. De bijeenkomsten in Dongen en op andere locaties waren tot in de puntjes verzorgd. Ik ben blij met jullie praktische inbreng bij mijn vragenlijsten. Verder wil ik nog Ieteke en Jorien bedanken voor het in de goede banen leiden van de focusgroep discussies. Dankzij jullie inzet is er veel op tafel gekomen.

Boudewijn, bedankt voor je inbreng bij de vragenlijst voor consumenten. Jaap, het was gezellig om met je samen te werken. Dank voor je snelle reacties op tal van stukken.

Nederlandse Zuivel Organisatie (NZO), zonder jullie financiële bijdrage zou dit onderzoek niet mogelijk geweest zijn. Ik heb het erg gewaardeerd dat ik mijn eigen spoor kon volgen. Theo, tijdens onze gesprekken filterde jij de kernboodschappen voor de zuivelwereld uit mijn resultaten. Fijn dat ik tot twee keer toe aan de Heelsum Workshop heb mogen deelnemen. Dank ook voor de organisatie van een heuse Masterclass rondom mijn proefschrift.

Heidi, Marjolein, Suzan, Yvonne, Janneke, ik ben blij dat ik jullie heb mogen begeleiden met jullie afstudeervak. Ik heb ook veel van jullie geleerd.

Cheryl, Natasja, Ellen, kamergenoten op de Leeuwenborch en later in de barak, door de theepauzes kwam mijn onderzoek even op de tweede plek. Dan was het tijd om de ontwikkelingen

Dankwoord

in het zuiveldrama ‘Meiden van de Wit’ (als verplichte kost), maar ook ‘Expeditie Robinson’ en ‘Idols’ te evalueren.

Andere collega’s bij Communicatiewetenschap, hoewel we het afgelopen jaar afgezonderd zaten in de barak, heb ik erg genoten van het samenzijn op de bank en het uitzicht op het zeer groene landschap (mijn volgende studieobject...). De sportieve vakgroepuitjes, etentjes en het gedans op tal van feesten waren zeer gezellig. Maar ja, ik vond het tijd voor een nieuwe uitdaging en inmiddels heb ik een nieuw stekje gevonden op slechts enkele honderden meters van jullie vandaan.

Pap, mam, Jeroen, het was wel even slikken dat ik er weer vier jaar in Wageningen aan vast wilde plakken. Dank voor jullie interesse, met jullie kon ik mijn successen delen: weer een publicatie, weer een foto in een blad.

Armand, dank voor de technische assistentie bij het ‘opleuken’ van mijn figuren, de lay-out van dit proefschrift en het ontwerp van de omslag. Je hebt me geleerd om vaker het achterste van mijn tong te laten zien. We hebben ‘ups en downs’ met elkaar gedeeld. Heel wat uurtjes hebben wij gediscussieerd over de zin en onzin van het ‘AIO-schap’ (of liever gezegd ‘promovendus-schap’): we zouden er wel een boek over kunnen schrijven...

Sonja

LIST OF PUBLICATIONS

International peer-reviewed articles:

- De Vries H, Van Dillen SME. Prevention of Lyme disease in Dutch children: analysis of determinants of tick inspection by parents. *Preventive Medicine* 2002; 35: 160-165.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Understanding nutrition communication between health professionals and consumers: development of a model for nutrition awareness based on qualitative consumer research. *American Journal of Clinical Nutrition* 2003; 77: 1065S-1072S.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Perceived relevance and information needs regarding food topics and preferred information sources among Dutch adults: results of a quantitative consumer study. *European Journal of Clinical Nutrition* 2004; 58: 1306-1313.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Exploration of possible correlates of nutrition awareness and the relationship with nutrition-related behaviors: results of a consumer study. Submitted for publication to the *Journal of Nutrition Education and Behavior*.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Identification of nutrition communication styles and strategies: a qualitative study among Dutch GPs. Submitted for publication to *Patient Education and Counseling*.
- Van Dillen SME, Hiddink GJ, Koelen MA, Van Woerkum CMJ. Nutrition communication styles of family doctors: results of quantitative research. *European Journal of Clinical Nutrition* 2005; 59: S47-S56.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Nutrition communication in general practice. Submitted for publication to *Current Nutrition & Food Science*.
- Van Dillen SME, Szwajcer EM, Van Binsbergen JJ, Hiddink GJ, Van Woerkum CMJ. Experts and non-experts in health care settings: an area of tension? Submitted for publication to *BMC Family Practice*.

National peer-reviewed articles:

- Van Dillen SME, De Vries H. Bescherming van kinderen tegen tekenbeten. *Tijdschrift voor Jeugdgezondheidszorg* 2000; 1: 12-15.
- Van Dillen SME, De Vries H. Preventie van tekenbeten en ziekte van Lyme: een determinantenonderzoek. *TSG/Tijdschrift voor Gezondheidswetenschappen* 2001; 79: 90-96.
- Ter Telgte YM, Van Binsbergen JJ, Van Dillen SME, Hiddink GJ. Informatie over voeding: de toegevoegde waarde van internet. *Patient Care* 2004; 31: 673-676.

List of publications

Professional journals:

- Blom J, Van Dillen S. Voedselkeuze vooral bepaald door smaak. *VoedingsMagazine* 2002; 5: 19.
- Geerts A, Van Dillen S. Huisarts is deskundig en betrouwbaar en scoort goed bij consument. *VoedingsMagazine* 2004; 6: 8-10.

Abstracts

- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Understanding nutrition communication between health professionals and consumers: results of qualitative consumer research. *Third Heelsum International Workshop 'Nutrition guidance of family doctors: Towards best practice'*, Heelsum, The Netherlands, December 10-12, 2001.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Voedingsinteractie met de huisarts: eerste resultaten van consumentenonderzoek. Nederlands Public Health Congres-V&W-NVAG Congres 'Communicatie of concurrentie?', Nijmegen, The Netherlands, May 23, 2002. *TSG/Tijdschrift voor Gezondheidswetenschappen* 2002; 80 (3): 25-26.
- Van Dillen S, Hiddink GJ, Koelen M, De Graaf C, Van Woerkum C. Towards a more effective nutrition communication between health professional and consumer: The consumer perspective. Amsterdam School for Cultural Analysis (ASCA) and Mansholt Conference 'Eat and Drink and Be Merry? Cultural Meaning of Food in the 21st Century', Workshop Health, Healing and Well-being, Amsterdam, The Netherlands, June 3-5, 2002, 24-31.
- Van Dillen SME van, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Attitudes towards food topics: Results of a quantitative survey among Dutch consumers. *Appetite* 2002; 39, Abstracts of the 10th Food Choice Conference 2002, Wageningen, The Netherlands, June 30 - July 3, 2002, 236.
- Van Dillen S, Hiddink GJ, Koelen M, De Graaf C, Van Woerkum C. Voedingsinteractie met de huisarts. *Etmaal van de Communicatiewetenschap, the Netherlands School of Communications Research (NESCOR)*, Nijmegen, The Netherlands, November 13-14, 2003, 70-71.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. GPs' views on nutrition communication: a Dutch qualitative study. *WONCA Europe 2004 – European Society of General Practice/Family Medicine, Regional Conference Quality in Practice*, Amsterdam, The Netherlands, June 1-4, 2004, 74.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Nutrition communication styles used by Dutch family doctors. *International Conference on Communication in Health Care (EACH)*, Brugge, Belgium, September 14-17, 2004, P08.19.
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Het gebruik van communicatiestijlen ten aanzien van voeding door huisartsen. *Etmaal van de Communicatiewetenschap, the Netherlands School of Communications Research (NESCOR)*, Enschede, The Netherlands, November 18-19, 2004, 62.

-
- Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Nutrition communication styles of family doctors: results of qualitative and quantitative research. *Fourth Heelsum International Workshop 'Empowering family doctors and patients in nutrition communication'*, Heelsum, The Netherlands, December 13-15, 2004, 12.
 - Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. Exploring the different nutrition communication styles of Dutch family doctors. *Annual Meeting British Feeding and Drinking Group (BFDG) and Werkgroep Voedingsgewoonten (WEVO)*, Wageningen, The Netherlands, April 11-12, 2005.
 - Van Dillen SME, Hiddink GJ, Koelen MA, De Graaf C, Van Woerkum CMJ. The role of Dutch GPs in nutrition communication. *Annual Meeting of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA)*, Amsterdam, The Netherlands, June 16-18, 2005.

Other

- Van Dillen S. Smaak staat bovenaan bij voedselkeuze. *Eye, Zicht op trends* 2002, 5(12): 22.
- Van Dillen S. Voedingsvoorlichting via intermediairen. In: *Preventie: samen werkt het! Gezondheidsvoorlichting door paramedici*, M. Van der Burgt en E.J. Van Mechelen-Gevers, Houten/Diegem, The Netherlands: Bohn Stafleu Van Loghum, 2002, 80-89.
- Van Dillen S. Vooral 'lekker eten' houdt mensen bezig. *Wb* 14, April 17, 2003, 6.
- De Vries H, Van Dillen S. I-PLAN: Planning the prevention of Lyme disease, a health promotion approach. In: *Progress in Lyme disease research*, F. Columbus, New York: Nova Science Publishers, 2005, in press.

CURRICULUM VITAE

Sonja van Dillen was born on November 1, 1975 in Maastricht. In 1994, she graduated at the Trichter College in Maastricht. At the same year, she started the MSc-study Health Sciences at Maastricht University. She specialised in health education and promotion. She conducted a qualitative study about the evaluation of a tick bite prevention program for the National Association of Municipal Public Health Services (GGD Nederland) in Utrecht. In addition, she organised a quantitative study to study the determinants of tick inspection by parents. In September 1999, she received her Master in Public Health (MPH). After graduation, she was involved in several projects of the National Association of Municipal Public Health Services, like the tick bite prevention project, a programming study in youth health care and a project concerning information standards about infectious diseases. Also, she worked as a health counsellor for the Municipal Public Health Service (GGD) in Arnhem. She was involved in research and in development of education materials for different target groups.

In October 2000, she started her PhD-study called *Nutrition Communication through Health Professionals* at the Communication Management Group of Wageningen University. She joined the education program of the Mansholt Graduate School and attended advanced courses of the Graduate School for Food Technology, Agrobiotechnology, Nutrition and Health Sciences (VLAG), the Amsterdam School for Cultural Analysis (ASCA) and Graduate School Psychology and Health. In 2002, she participated in the European Training Consortium about Public Health and Health Promotion (ETC-PHHP) in Valencia. Furthermore, she participated in the Third and Fourth Heelsum International Workshop.

In June 2004, she started working as a post-doctoral researcher at the research institute Alterra in Wageningen with the project called *Vitamin G: Effects of green space on health, well-being and social safety*. In addition, she holds a position as assistant professor in research methods and techniques at the Socio-spatial Analysis Group of Wageningen University.

The research was carried out at the Communication Management Group of Wageningen University and financially supported by the Dutch Dairy Association NZO. Printing of this thesis was financially supported by the Dutch Dairy Association NZO.

Cover design & lay-out: Armand Hermans

Printed by: Grafisch Service Centrum, Wageningen