Present and Future of Nutrition Guidance

Lifestyle Advice in Primary Care

Prof.dr Gert Jan Hiddink

Farewell address upon retiring as Special Professor of Nutrition Communication through Health Professionals at Wageningen University & Research on 9 February 2017

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Introduction

Physicians are perceived as the best source of health information, the most credible source, and, after the media, the source most often used (1-5). Primary care physicians (PCPs) can potentially play a key role in providing nutrition information (4). In 1 year, about 70% of patients visit the doctor at least once; in 3 years this figure is about 90-95% (5). In 14-28% of consultations, diet comes up for discussion (3,6,7), the initiative being evenly divided between PCP and patient (6). These sentences come from the introduction of the article that was published 20 years ago in the American Journal of Clinical Nutrition in 1997 (8), as part of my PhD study. In a random sample of Dutch consumers, we investigated their referral to 11 nutrition information sources, the perceived expertise of these sources (9), their interest in nutrition information, and their nutritional attitudes and beliefs. Factor analysis resulted in two factors: non-commercial sources (Cronbach`s alpha = 0.70) and commercial sources (Cronbach`s alpha = 0.78). Respondents' referral to, and perceived expertise of, sources were significantly higher for non-commercial than for commercial sources. We found a strong correlation between referral scores and perceived expertise. There were three leading non-commercial sources: the PCP, the dietitian, and the Netherlands Food and Nutrition Education Bureau (FNEB= predecessor Dutch Nutrition Centre). Because of their high referral scores, high perceived expertise, and reach to nearly all segments of the population, PCPs are in a unique position compared with dietitians and the FNEB.

In their consultations, PCPs probably do not make sufficient use of the opportunities for health education about nutrition (9,10). This is regrettable because of the increasing evidence that a significant part of quality of life depends on adequate food and nutrition practices (11). I use the words family physician, primary care physician

(PCP), general practitioner (GP) synonymously. Generally, PCPs are not aware of the extent to which patients value lifestyle advice (12) and underestimate patients` interest in receiving health education (13). Patients are of the opinion that PCPs should show more interest in their lifestyle (14,15). According to Van Weel (16) and Pereira Gray (17), the trust patients have in their GP and the time factor should be placed in the perspective of continuity of care: patients consult their GP often over relatively long periods of time, often many decades (16,17). Pereira Gray stated that this allows for building and reinforcing (nutrition) advice over a number of consultations, rather than a one-off shot (17). The structure of health care in different countries is different. Particularly when GPs have a stable, official list of patients and where they are the gate-keepers for specialist medical services - as is the case in the Netherlands - they can get to know their patients and their families better and have more occasions for nutrition advice.

Initial aim of my research

On the basis of many years of experience in nutrition communication to health care professionals, I aimed not only to identify determinants of PCPs`nutrition guidance practices, but also to improve these practices with a carefully designed intervention, and to evaluate the effects of such intervention. In other words, I needed a model for health promotion planning, and I found this in Green & Kreuter`s Precede-Proceed Model (18). PRECEDE is een acronym for "predisposing, reinforcing, and enabling constructs in educational / ecological diagnosis and evaluation", and PROCEED for "policy, regulatory, and organizational constructs in educational and environmental development". The goals of the model are to explain health-related behaviors and environments, and to design and evaluate the interventions needed to influence both the behaviors and the living conditions that influence them and their consequences. This model has been applied, tested, studied, extended, and verified in over 960 published studies and thousands of unpublished projects in community, school, clinical, and workplace settings (19).

The driving vision of Professor Green is: If we want more evidence-based practice, we need more practice-based evidence (20). My research aim was to carry out practice-based research, in line with this vision. Making a choice between the existing behaviour change models is problematic because each has different approaches; they all have also their limitations and tell only a part of the story (21-40). Therefore, I incorporated the most important factors (e.g. self-efficacy) of all these models in my research, in a nationwide random sample of 1000 GPs in the Netherlands, who had been in practice for 5 to 15 years and were stratified by sex and type of practice (41-45). The net response rate was 64% (41).

We identified GPs' perceived barriers for nutritional guidance for their patients and their nutritional attitudes and behaviours (41-43). GPs perceived smoking as the greatest health hazard, followed by dietary pattern and genetic disposition. Seventy per cent expressed considerable interest in the role of nutrition in health (41). However, GP involvement in nutritional matters was very low. GPs perceived strong barriers to their involvement in nutrition advice. The most important barriers were : not being trained in nutrition, lack of time to address nutrition issues, and the perception that patients lack motivation to change lifestyle and/or dietary patterns

Analysis of the qualitative research (focusgroup discussions and in-depth interviews with PCPs) revealed the following four predisposing factors for PCPs` nutrition guidance practices: PCPs`perception of his/her own ability to influence the lifestyle and eating habits of patients with health problems (this is a self-efficacy factor) (18, 30); interest in the effect of nutrition on health and disease; PCPs`perception of his/her own ability to give dietary advice on the treatment and prevention of coronary heart disease (this is also a self-efficacy factor) (18, 30); and perception of role of behavior and heredity in health. In our quantitative research, we identified predisposing factors, driving factors, and perceived barriers as determinants of PCPs`nutrition guidance practices (41-43), information sources and strategies of nutrition guidance used by PCPs (44), and also the determinants`mechanism of action (45). The variable PCPs "Noticing Patients' Overweight and Guidance of Treatment" was operationalized in six items, constructed on the basis of factor analysis (45) and has a Cronbach's alpha of 0.66. One item addresses the percentage of patients whose weight is noticed by the PCP. Five items are about guidance of treatment: three concerning the discussion of overweight problems, and two concerning the extent of the advice. In our postulated general LISREL model of the mechanism of action of the determinants of PCPs`nutrition guidance practices, the predisposing factors act directly on the dependent variable and/or indirectly through driving forces and barriers which act as intermediary variables.

We tested the postulated general model on the assembled data, and we confirmed it (45). We analyzed whether the predisposing factors acted directly on the dependent variable and/or whether driving forces or barriers acted as intermediary variables. The mechanism of action of determinants of "Noticing Patients' Overweight and Guidance of Treatment" was idenfified. Policies to improve PCPs`nutrition guidance practices might in future benefit from a LISREL-model analysis of determinants of these practices to become more effective (45). We designed the research in such a way that we were able to make it a longitudinal study (46-48), which allows for monitoring variables and the mechanism of action,

and for detecting eventual trends. Glanz et al (49) and Kushner (50) also identified barriers, and Levine et al (10) and Orleans et al (12) carried out US national surveys of PCPs`attitudes and practices to define strategies for enhancing the use of clinical nutrition and health promotion in medical practice.

GPs were often asked for dietary advice by their patients, but 20 years ago there was very little evidence on which to base their advice. "Nutrition" fulfilled the primary care enigma that what is most common in medical practice has been least studied in biomedical research (51). Professor Hautvast had a brilliant idea: to organize an International Workshop with all the important players in the field (8, 52-54), as an exploration of the existing practices and experiences worldwide with which to compare our results. In the first Heelsum workshop, Van Woerkum adressed three types of interaction between the GP and the patient: prescription, persuasion and the interaction model (55). In the last model, the GP and the patient are seen as partners. We used this model throughout the Heelsum workshops. Glanz summarized the workshop with a review of PCPs` nutritional attitudes and counselling practices (56).

Problem of overweight and obesity

In 2000, the World Health Organization (WHO) decided to define obesity as a disease (57). Obesity is associated with increased risks of several chronic diseases, especially type 2 diabetes mellitus, cardiovascular diseases, and musculoskeletal disorder. Obesity at age 40 has been shown to reduce life expectancy by seven years in women and six years in men. The increased prevalence of chronic diseases that are partially due to overweight causes a large burden on the health care system and is associated with considerable health care costs (58). The Dutch National Institute for Public Health and the Environment (RIVM) undertook the project "Nederland de Maat Genomen" (in 2009 and 2010, sample of 4500 individuals from the general population). Of Dutch men between 30 and 70 years, 60% were overweight (BMI over 25), 13 % were obese (BMI over 30), 27% had abdominal obesity, 6% had diabetes and 34% had metabolic syndrome (at least three out of five risk factors: abdominal obesity, high blood pressure, low HDL- cholesterol level, elevated glucose- and/or triglyceride level). Of Dutch women in this age group, 44% were overweight, 14% were obese, 39% had abdominal obesity, 4% had diabetes and 24% had metabolic syndrome. Having metabolic syndrome raises the risk of diabetes type 2 and coronary heart disease. The Dutch Dietary Guidelines (Dutch Health Council) (59), the World Cancer Research Fund (60), and the American Institute of Medicine (61) all stress the importance of a normal body weight.

International Workshops of the Heelsum Collaboration on Nutrition in Primary Care

The workshops were built on research collaboration between Wageningen University with its departments of Human Nutrition (Professor Hautvast) and of Communication Sciences (Professor Van Woerkum), the Radboud University, Nijmegen with its Department of General Practice /Family Medicine (Professor Van Weel), and the Dutch College of General Practitioners (Dr Drenthen). The participants in the Heelsum collaboration are scientists in the fields of nutrition, health promotion, (nutrition) communication, general practice, epidemiology, and methodology, as well as researchers interested in the interface between nutrition education and medicine in general practice. Participants came from 10-15 countries. Professor Hautvast acted as Chair. Throughout the meetings, participants used the words family physician, primary care physician, general practitioner (GP), synonymously.

Since 2004, Professor Van Weel has been acting as Chair, and Professor Kok as Vice-Chair. The Proceedings have been published in peer-reviewed journals, twice in the American Journal of Clinical Nutrition (53,62), twice in the European Journal of Clinical Nutrition (63,64), and twice in Family Practice (65,66). I will now discuss the development in the titles and the content of the Heelsum Workshops over time (Table 1).

Table 1 Development in titles and content of the Heelsum Workshops (1995-2010)

Heelsum I	Nutritional attitudes and practices of primary care physicians, 1995; AJCN 1997 (54)
Heelsum II	Family doctors and patients: is effective nutrition interaction possible?', 1997; EJCN 1999 (60)
Heelsum III	Nutrition guidance of family doctors, 2001. AJCN 2003 (67)
Heelsum IV	Empowering family doctors and patients in nutrition communication, 2003; EJCN 2005 (70)
Heelsum V	Creating supportive environments for nutrition guidance: towards a synergy between primary care and public health, 2007; Fam Pract 2008 (74)
Heelsum VI	Practice-based evidence for weight management: alliance between primary care and public health, 2010; Fam Pract 2012 (100)

The title of the second Heelsum workshop (1998) suggested ambiguity and at the same time a sense of realism: "Family doctors and patients: is effective nutrition interaction possible?" (63, 67- 76). The answer was in short: YES, but with quite a number of prerequisite contextual factors. The agreements reached at Heelsum II are shown in Table 2.

Table 2 Agreements reached at Heelsum II (67)

• GPs highly trusted for nutritional advice
• Treatment of obesity: difficult, a very common problem in primary care. GPs were ambiguious, not very succesfull
• Overweight is not the fault of the GP (69)
• Barriers were identified: shortage of time, doctors' lack of detailed nutrition knowledge and skills and lack of patients` motivation to change food habits.
• "Missed opportunities" in GPs` interaction with patients
• GPs have to distil simplified principles, essentials of dietetics
• Secondary and tertiary prevention is the main place for nutrition advice in general practice
• Quote: "'The modern epidemic of obesity is not going to go away until the wider society, politics and economics and education give this priority".

The priority indicated in the quote in Table 2. is set now in most countries: family doctors are part of a wider team when they weigh patients routinely and educate patients when their BMI is too high (68).

Patients present a large variety of health problems to general practice (Van Weel, the Nijmegen Continuous Morbidity Registration (16)). Patients may suffer from more than one disease at the same time (co-morbidity) (16), and nutritional advice is often relevant for their management (16). This was also shown by Van Binsbergen & Drenthen with their approach to nutritional questions in general practice by means of the International Classification of Primary Care-code (ICPC) (70). The effectiveness of dietary intervention in general practice was reviewed by Mant (54). Patients also have a widely varied interest in, and knowledge of, nutrition. This implies that there is a need for broad nutrition knowledge and for individual tailoring of advice. Truswell addressed the question of what nutrition knowledge and skills PCPs need to have and how this should be communicated (71). The development of core competencies in clinical nutrition is of utmost importance (77,78). Lazarus et al tested the effect of an educational programme provided by a physician nutrition specialist (79). Maiburg et al developed nutrition modules for Dutch general practice vocational training and identified also the determinants of GP trainees`nutrition guidance practices (72).

These prerequisite contextual factors for facilitating effective nutrition interaction between family doctors and patients identified in Heelsum II, were addressed in the third Heelsum workshop (2001) with a short title: "Nutrition guidance of family

doctors" (62, 80-85). Truswell et al described family doctors`nutrition guidance practices in a changing world, with their problems, opportunities, and also future possibilities (81). Mercer et al reviewed possible lessons from the tobacco experience for obesity control (82).

The title of the fourth Heelsum workshop (2004) (64, 86-96) showed that we were aware that empowering and support were needed for both family doctors and patients. The disease-based evidence in primary care, the individual strategy of change, and the population interface of primary care were central themes in this workshop. Family physicians deal with a large range of illnesses and diseases, with nutrition often related to their prevention or a health-promoting intervention. The quality of nutritional advice must be judged by the evidence of all these interventions in terms of (primary) care outcomes. Lifestyle advices (including nutrition) are often strategies for individual change, rather than disease interventions. Lifestyle is a community characteristic as much as an individual one. Individual patients need to be empowered to discuss with their doctor matters in their lifestyle about which they are concerned. Doctors and patients work as partners, each with their own contribution. The doctor has the medical knowledge, patients know their food habits and beliefs. We discussed the role of empowerment in making healthy choices easy choices (87); public health impact of community-based nutrition and lifestyle interventions (88); influencing patients` nutrition patterns through communication (89); potentials and pitfalls for nutrition counselling in general practice (90); the role of social support in lifestyle-focused weight management interventions (91); PCPs`different communication styles (92), and the rarity of reported nutritional deficiency in general practice (97).

The expression "creating supportive environments for nutrition guidance" in the title of the fifth Heelsum workshop " (2007) (65, 98-109) shows that we were aware of the importance of the environment, both for GPs and for patients. The second part of the title shows that we were striving for a synergy between primary care and public health.

To give you some flavour of the subjects discussed: Green used a model of a pipeline to illustrate how small a proportion of the amount of biological research reaches the frontline of medicine (100) , and Rosser (101) worked in Canada to convert this into a practical form for GPs. Visentin (102) explained why the best evidence for family practice should be based on GPs' experience; he gave examples of important nutritional research conducted by a large general practice network in Italy. Brug (103) reviewed the evidence in the socio-psychological literature on factors associated with the behaviors of increased physical activity and/or change of food habits.

Work in GP practice on overweight and obesity should fit the needs, beliefs, and problems of the individual patient (104). Pomeroy and Worsley (105) found in Australia that GPs see themselves, in advising on nutrition, mostly as influencers or coordinators (with nurses and dieticians), or (less commonly) as diet educators. Worsley reviewed how to improve the impact of general physicians` nutrition guidance, in terms of public health versus individual patient (74).

Two papers dealt with collaboration between public health /health promotion and individual medical care. Koelen et al (106) reviewed the literature on what is needed for successful collaboration. Jansen et al analysed why the "Heartbeat" programme in Maastricht failed (107). These two papers are the first experiences of a concerted public health/primary care approach. Their success and failure will provide most valuable experience for building further coordinated programmes.

Laws (93) reported on" Counterweight", a well-designed, large trial of obesity management in general practices in England and Scotland. The methods were evidence-based, 80 general practices participated, and the results are both encouraging and plausible. Obesity can be treated in general practice but it requires a team effort, with one of the partners interested in the problem, with an in-house practice nurse, and with a dietitian as consultant associated part-time with the practice. Here the alliance between public health and primary care became visible in practice, and the implementation of this successful UK model for obesity management in general practice (108) was again addressed in the sixth Heelsum workshop (implementation in Scotland, UK) (110).

The title of the sixth Heelsum workshop: "Practice-based evidence for weight management: alliance between primary care and public health" (66, 110-126) recognizes both professor Green`s vision that we need more practice-based evidence (20) and the most important theme of the Heelsum workshops (weight management), as well as the need for an alliance between primary care and public health to fight overweight and obesity, and all its comorbidities (type 2 diabetes, metabolic syndrome, coronary heart disease, cancer) (59). Green et al gave four reasons for these alliances: most of the influences on weight management behaviour are beyond the control of primary care; they are not subject to the randomized controlled trial methods of evidence-based medicine; the ratio of intervention effort to impact does not favour clinical interventions; and physician support is needed for community intervention success (115). Patients differ widely in their interest in, and knowledge of, nutrition. Often patients will surf the Internet to find information about their disease and dietary recommendations. The scientific reliability of medical information on the Internet varies enormously. Family physicians need to

be educated to be able to recommend the reliable websites. Their patients also need to be educated in this respect by family physicians and by the broader nutrition and health promotion community. This implies that there is a need for broad nutritional knowledge and for individual tailoring of advice. The family doctor and the practice nurse can start with this, followed by a dietitian and by nutrition education (f.e. the Dutch Nutrition Centre), and by – hopefully - positive and accurate reports in the mass media. The scientific community needs to fulfill its role as "fact checkers" when media publicize doubtful claims about nutrition. In the connecting phase of communication, emotion in the message can help to connect, but the scientific facts need to be the basis of communication. It is important to know that emotion is incorporated in behavior change models.

Truswell looked behind the scenes of doctors' nutritional advice, and discussed the infrastructure of nutrition information used in practice (112, 116). Van Avendonk et al discussed the introduction of the Dutch College of General Practitioners` guidelines for obesity and undernutrition (113). Guidelines like this one will be of great help to family doctors but will also be beneficial for the patient. Seidell et al (117) presented an integrated health care standard for the management and prevention of obesity in the Netherlands.

Brotons et al (on behalf of the European network on prevention and health promotion) explored the views of patients in Europe, especially their beliefs about the importance of lifestyle and preventive services, their readiness to make changes in diet and physical activity, and their willingness to receive support from GPs (118). More than 50 % of patients thought that lifestyle is important for their health with respect to eating habits, physical activity, and normal body weight. Almost 50% of patients thought that they should improve their lifestyle. More than 50% of patients said that they have plans to change, and two-thirds said that they were confident of succeeding. Two-thirds of patients said that they would like to receive support from their GP. About half of the patients reported that GPs initiated a discussion about these topics. A high proportion of patients with unhealthy lifestyles did not perceive the need to change. About half of patients reported not having any discussion on these topics with GPs or primary care team. There is a discrepancy between patients` expectations and GPs`performance, which needs urgent attention!

Opportunities and challenges for nutrition and physical activity communication and health promotion

Determinants of Dutch GPs`nutrition and physical activity guidance practices
What exactly are the nutrition and physical activity guidance behaviours of GPs, and which factors are the determinants?

In a cross-sectional study, we assessed the determinants of Dutch general practitioners` nutrition and physical activity guidance practices (among 472 GPs in practice for 5–30 years) (127). The majority of GPs had similar practices for nutrition and physical activity guidance. They were more inclined to guide their patients on physical activity than on nutrition. In most models, self-efficacy was found to be a determinant of guidance practices. Guidance practices proved to be a mix of prevention and treatment components. Consequently, we advised raising GPs`self-efficacy by training in medical school and in continuing medical education. We also recommended the combination of both nutrition and physical activity guidance in general practice. In our critical review of nutrition and physical activity guidance practices in general practice, we aimed to provide insight into the main outcomes of research on communication about nutrition and /or physical activity between GPs and patients, for prevention or treatment of overweight and obesity (Jan 1995-Jan 2012, 41 studies) (128). More studies were found about the guidance of obese patients than of overweight patients. The most common weight guidance practice was discussion of weight. The range of communication strategies for nutrition proved to be more diverse than that for physical activity. The advice given about nutrition and physical activity was quite general. GPs' provision of combined lifestyle advice to overweight and obese patients seemed to be rather low. The practice implication is that observational research is needed to unravel the quality of the advice given by GPs to these patients (128).

The Internet and personalised nutrition
The Internet and computers bring specific information into the consultation at an unprecedented scale, detail, and speed. This offers the possibility to present evidence on diet and disease and dietary advice in the consultation, if the software has been prepared and updated by a country's GP organization (111). The Dutch College of GPs, for example, has developed software that gives the doctor prompts on when to ask a nutrition question or record body weight (or BMI). Software has also been developed with dietary prescriptions that can be printed out, discussed, and handed to the patient. Software has been developed for use in GP practice with overweight patients by the Dutch College of GPs by Drenthen & van Binsbergen (109) and in Canada (Rosser, 101). The Internet has also revolutionized access to technical

information. Therefore, in the Heelsum workshops, research into the development and impact of computer-tailored nutrition education was reviewed (75), as well as the present and future of computer-tailored nutrition education (85), and the challenges and opportunities presented by the Internet for nutrition education (83, 94). Personalized nutrition communication through ICT applications can be instrumental in overcoming the gap between potential effectiveness and reality, according to Bouwman et al (95). They stressed the personal factor in nutrition communication (129) and also explored GPs`perspectives on gene-based personalized nutrition advice (130).

In the medical world, evidence-based information has changed practice too. The Heelsum Workshops devoted a half day (84) to bringing general practice's needs into the Cochrane Collaboration (in 2004) and looked at nutrition material in the Cochrane Collaboration in 2007 (96). Following this workshop, a new field for the Cochrane Collaboration on general practice research was initiated by Van Binsbergen. Since 2007, this has been integrated into the Cochrane Primary Health Care Field, the collaborative of the universities of Auckland, Dublin, and Nijmegen (131). GPs would like to give evidence-based nutrition advice, but most of the concepts on nutrition and aetiology are not based on randomised controlled trials, the only evidence with which the Cochrane Collaboration deals.

Communication between health professionals and consumers
How can we gain a better understanding of nutrition communication between health professionals and consumers, and make communication between them effective?
We developed a model based on qualitative consumer research (132, 133), and compared Dutch family doctors`and patients` perspectives on nutrition communication (134). GPs are able to use different nutrition communication styles (135,136). To overcome GPs` barriers, a minimal intervention strategy was developed to address overweight and obesity in adult primary care patients in the Netherlands (137).

On the basis of a quantitative consumer study among Dutch adults in 2004, the perceived relevance and information needs regarding food topics and preferred information sources were identified (138). Rank orders for perceived reliability, perceived expertise, clarity, accessibility, and overall were assigned to information sources with respect to nutrition and health. Please look at the family doctor on top of the list of Table 3. It would be interesting to repeat this exercise!

Table 3 Rank orders for perceived reliability, perceived expertise, clearness, accessibility and overall assigned to information sources with respect to nutrition and health. (Van Dillen, SM et al. Eur J Clin Nutr 2004, 58 : 1306-1313)

Information source	Reliable	Expertise	Clear	Accessible	Overall
Family doctor	1	2	2	1	1
Dietitian	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

Communication with attentive audiences at the right time, using the perceived relevance and information needs of sub-populations of citizens regarding food topics and preferred information sources, can be effective

Trends on the basis of cross-sectional and longitudinal analyses

Through cross-sectional and longitudinal analyses of nutrition guidance by PCPs and comparing these with findings from five years earlier, we confirmed the mechanism of action of determinants and found trends (46). We again studied the LISREL-model

of "Noticing patients' overweight and guidance of treatment", both in two different representative cross-sectional PCP study populations, and in a cohort cross-sectional study at two points in time. This study again confirmed that PCPs' nutritional guidance practices are determined partly directly by predisposing factors and indirectly via driving forces and barriers. It also showed that "Noticing patients' overweight and guidance of treatment" decreased significantly over the last five years. Two of the four predisposing factors and two of the three driving factors also decreased significantly. The situation deteriorated, and PCPs needed to work on this, but they are not able to do the work alone; a multi-faceted approach is needed.

Visser et al carried out research into the longitudinal changes in task perceptions, self-efficacy, barriers, and practices of nutrition education and treatment of overweight of Dutch GPs between 1992 and 2007 (47). Fewer GPs in 2007 thought treating overweight was a waste of time, but GPs`concerns about lack of time and doubt over patients' motivation increased somewhat (47). Another longitudinal study of changes in "Noticing patients' overweight and guidance of treatment" by Dutch GPs between 1997 and 2007 (48) showed that the LISREL path analysis of the 2007 data compared with the 1997 LISREL path model (45) shared the same backbone of the mechanism of action. The influence of GPs` task perception on "Noticing patients' overweight and guidance of treatment" had increased considerably in 2007 compared to 1997. The longitudinal character of these studies adds to a strong practice-based evidence for weight management by GPs. By monitoring trends one can adjust policies, nutrition communication, and health promotion.

Nutrition awareness and pregnancy: implications for the life course perspective
Nutrition awareness is an important factor for reaching and maintaining good eating habits (139, 140). Consumers`nutrition awareness and the relationship with nutrition-related behaviors were explored by Van Dillen et al (139). Szwajcer et al (141) wrote, and I quote : "Although exciting, pregnancy and even pre-conception may also lead to uncertainties and concerns about a woman's new identity as a (future) mother, triggering her to rethink and reconsider her nutrition. As a result, pregnancy, and particularly a first pregnancy, is likely to be one of the few critical periods when women are able to change nutrition-related behaviours that are difficult to modify at other times. Pregnancy can therefore be seen as a major transition in a woman's life and may have a positive influence on a woman's future health and nutrition behaviour and that of her family. In the literature, this phenomenon has been introduced as the "Life Course Perspective" (LCP). This life transition plays a role in addition to the more traditional variables, such as individual patterns of behaviour or health across time, cultural and contextual influences. It also provides a whole new window of opportunities for healthy nutrition promotion activities" (141).

UNQUOTE. Szwajcer et al carried out a number of studies on nutrition awareness and nutrition- related information-seeking behaviours before and throughout different trimesters in pregnancy (140-142); and of women trying to conceive and pregnant women (143), and their consequences for nutrition communication (142), and its implications for the Life Course Perspective (140). They interpreted the results as evidence for the LCP (143). Wethington has given an overview of the LCP and its implications for health and nutrition (144). In search of the best way to present written nutrition communication in midwifery practice, Szwajcer et al reviewed the purposes of written nutrition communication (137). Important information sources during first-time pregnancies were the Internet (anonymous and up to date) and extended books during the first trimester; midwives, the 9-month calendar (fun and tips), and pregnant friends in the second trimester; and friends (information on breastfeeding) in the third trimester. Second-time pregnant women relied mainly on their experience, and a midwife and books for specific questions (145,146).

Opportunities and challenges for the future

How can we improve lifestyle advice in primary care in the future?

Importance of both qualitative research and quantitative research

In general, qualitative research is required to understand how health practitioners and their clients / patients negotiate the meaning of a health condition or a dietary pattern in the context of the patients everyday life, and in particular the normative expectations from the patient and the health practitioner. Quantitative studies are important to establish statistical significance of causal mechanisms, determinants of behaviour and effectiveness of interventions. By monitoring trends in both qualitative and quantitative research, one can adjust policies, nutrition communication and health promotion; I have given some examples. Tackling the rise and health consequences of overweight and obesity is one of the most common health problems in primary care, now and in the future. PCPs are not aware of the extent to which patients value lifestyle advice (12) and underestimate patients `interest in receiving health education (13). This needs to be changed. Work in the practice on overweight and obesity should fit the individual needs, beliefs, and problems of patients (104). There is a need to develop nutrition advice methods that can be used in a variety of primary health-care settings and for a variety of patient groups and health problems in general practice. Innovations in behaviour change theory and what health means for individuals can be helpful in this. An example of this is the application of the Salutogenic Framework to Nutrition Research and Practice (147-152). The definition of health is in discussion in science, and changing (153,154). Communication with attentive audiences at the right time, using the perceived relevance and information needs of sub-populations of citizens regarding

food topics and preferred information sources, can be effective. The best example of this is the first-time pregnant woman. At the end of this section a warning: All the work needed to carefully design an intervention in primary care practice or in public health, implementation, and evaluation, all along the lines of the Precede- Proceed Model, cannot possibly be carried out within the limits of a 4-years PhD programme.

The use of theory-based interventions

According to Contento`s reviews in 1995 and in 2002 (155, 156) and the Precede-Proceed model (19), theory-based interventions on PCPs`nutrition guidance practices are more effective than those that do not use theory. Therefore, one would assume that all the research carried out in this field would have a strong theoretical basis. Unfortunately, this is not the case. In a systematic review, Hooft van Huysduynen et al (114) assessed how often and which theoretical models of behaviour change were used in research articles on PCPs `nutrition guidance practices, published between 1995 and October 2008 (n = 111). In 45% of the articles in their systematic review, theories or theoretical models of behaviour change were included. No difference in proportion of model use was found with time. The transtheoretical model was used in 29% of the articles (114). The figure of 45% is slightly higher than found in Painter et al`s review (157), in which 36% used theoretical models in health behavioural research in general (between 2000 and 2005). Given the scientific state of the art, the costs of research, and the anticipated scientific and societal impact of the research, it is quite astonishing that more than half of the research conducted on determinants of nutrition guidance practices of PCPs did not include theoretical models. We need to aim for 100 % of theoretical underpinning.

Practice nurses (PNs) in primary care

Overweight or obese patients increasingly attend general practice, which is an suitable setting for weight-loss counselling. Practice nurses (PNs) - introduced in Dutch general practice in 1999 - are specially trained nurses who provide care to chronically ill people, monitor treatment outcomes, and offer follow-up contacts. GPs delegate tasks, such as support for lifestyle change, to PNs. Together with Noordman and Van Dulmen (NIVEL), Van Dillen and I carried out research on PNs. We examined the content of weight, nutrition, and physical activity advices provided by Dutch PNs through an analysis of video-taped consultations (158). Lose weight, eat less fat, and be more physically active in general were the main categories for each type of advice. Despite high clarity of advices, lower scores were found for specificity and personalization. Very rarely, nutrition advices were provided in combination with physical activity advices. Weight advices were often related to the patient's complaint. PNs seldom set a concrete weight goal. Although benefits of physical activity were discussed, often no practical advices were

provided about how to achieve this. Integrated lifestyle advice was not common: advices about nutrition and physical activity were fragmented throughout the consultation. The conclusion is clear: obesity prevention needs more emphasis in educational programmes of PNs (158). We also assessed the quality of weight loss counseling by Dutch PNs to overweight and obese patients, including both PNs' compliance with the Five A's Model for behavioral counselling in primary care (33) and the use of different communication styles (159). The Five A's Model is an analytical framework to evaluate the quality of counselling (Table 4). It provides a sequence of evidence-based practice behaviors that are effective in helping patients to change health behaviors (33-36). It can also be used for quality improvement (34). PNs most frequently Arranged follow-up, Assessed risk and current behaviour, and Advised. They rarely Assisted in addressing barriers and securing support. The quality of PNs' weight-loss counseling might be increased if PNs routinely provided Assistance in addressing barriers and securing support, and routinely reached Agreement with the patients on goals which are set together. When discussing weight or physical activity, most PNs used a motivational communication style. When discussing nutrition, they mostly used an informational communication style. In fact, PNs used a combination of communication styles.

Table 4 Description of Five A's Model for behavioral counseling in primary care

Five A's model	Description
Assess	Identification of current behaviour and determination of the patient's readiness to change behaviour
Advise	Recommendation that the patient would benefit from changing behaviour
Agree	Match and collaboratively set goals
Assist	Offer of help to address barriers and secure support
Arrange	Establishment of a method of follow-up to track the patient's progress by the same (or other) professional(s)

We also investigated the use of goal and implementation intentions to assess the quality of weightloss counselling provided by PNs to overweight or obese patients (160). Half of the consultations contained a goal intention; the majority aimed to change eating behaviour. Only some of these goal intentions could be considered implementation intentions. Actions (how elements) were not often included here. Lifestyle change rather than weight change was more often perceived as an overall consultation goal. Regarding patterns of overall consultation goals, the majority addressed only one lifestyle factor at a time. If PNs formulated weight change in their overall consultation goal, they also used goal or implementation intentions.

In a quarter of the consultations, PNs did not ask any further questions about weight, nutrition, or physical activity to gain further insights. This is an important missed opportunity for lifestyle counselling. Matching implementation intentions to PNs `broader overall consultation goals would be meaningful, leading to desired goal- directed behaviours and subsequent goal attainment. We reviewed also the extent to which primary care PNs act as case managers for life style counselling regarding weight management (161).

SLIMMER study

The SLIMMER study - a randomized controlled trial of diabetes prevention in Dutch primary health care- is an example of an alliance between primary care and public health. It consisted of both a nutrition and a physical activity intervention of 10 months`duration. The primary outcome was fasting insulin; secondary outcomes were anthropometry and glucose tolerance, dietary intake, Physical Activity, and Quality of Live. I am proud to be part of the SLIMMER study team: Sofieke van Oord-Jansen, Josien ter Beek, Judith Heinrich (GGD Noord- en Oost-Gelderland); Geerke Duijzer, Edith Feskens, Annemien Haveman, Ellen Elsman, Joanne Leerlooijer, Ellen van Dongen, Aafke Meints-Groenveld, Sandra Bukman, Nicole den Braver, Emely de Vet (Wageningen University); Josanne Huijg (Leyden Academy on Vitality and Ageing); Ardine de Wit (RIVM), Rykel van Bruggen and Martin Willink (PCPs). Also PNs, dietitians, physiotherapists and sports clubs are involved.

Duijzer et al translated the SLIM diabetes prevention intervention (162) into SLIMMER and reviewed the implications for Dutch primary health care (163). Jansen et al adapted the SLIM diabetes prevention intervention to a Dutch real-life setting involving joint decision making by science and practice (164). Duijzer et al reported on the the feasibility and potential impact of the SLIMMER pilot study (165). The design and methods for the process, effect, and economic evaluation of SLIMMER were published in 2014 (166). Using the intervention mapping protocol, Elsman et al developed a maintenance programme for the SLIMMER diabetes prevention intervention (167). The process evaluation of the SLIMMER study was published by Van Dongen et al (168). Papers have been submitted: on the effect and maintenance of the SLIMMER study (169), on the question of whether the success of the SLIMMER study was modified by socio-economic status (170), on the cost-effectiveness of the SLIMMER study (171), on the determinants of lifestyle behaviour change to prevent type 2 diabetes in high-risk persons (172), and a summarizing article in Dutch by Huisarts and Wetenschap (173). The most important message is: SLIMMER is effective in the short and longer term (18 months) in improving clinical and metabolic risk factors, dietary intake, physical activty, and quality of life, of persons at high risk of diabetes.

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Prof.dr Gert Jan Hiddink

''Meer dan 40 jaar ervaring met voedings- en gezondheids-communicatie hebben me geleerd niets voor waar aan te nemen zonder het zelf nader te onderzoeken. Meer dan 28 jaar ervaring als Manager Research Nutrition & Health (ZVG en NZO), en 17 jaar als bijzonder hoogleraar Nutrition Communication through Health Professionals hebben me bevestigd dat onderzoek doen spannend is, en dat ik uiteindelijk een onderzoeker ben, die na onderzoek via wetenschappelijke communicatie de kwaliteit van leven van individuen en gemeenschappen wil bevorderen.'

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