An exploration of perceptions and preferences for healthy eating in Dutch consumers: A qualitative pilot study

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Abstract

Background Unhealthy dietary patterns are highly prevalent in Western countries, and they have been associated with depression, hypertension, heart diseases, cancer, diabetes type 2 and obesity. Many dietary interventions have been developed to promote dietary behaviour, yet most do not achieve the intended dietary change. This study aims to provide a better understanding of what (Dutch) consumers perceive as a healthy diet (and how this relates to the current (Dutch) nutrition guidelines) and their preferences for how to eat (more) healthily. This is an essential consideration for the development of tailored interventions aimed to help people adopt changes in their dietary behaviour.

Methods Seventy-eight participants filled in an online questionnaire containing both open-and closed-ended questions. The qualitative data was analysed using content analysis resulting in a classification scheme that two students used to identify to which category each part of a participant's answer belonged.

Results For both the perception of a healthy diet and how to eat healthily four major categories and a residual category were identified but some with different subcategories: dietary patterns, food processing, food products, content/nutrients, and *other*. The results showed that how people perceived a healthy diet was mostly represented at the level of food product (vegetables and fruit) and the content/nutrient level (carbohydrates); whereas how they would like to eat healthily was mostly represented at the level of food processing (preparation), food product (vegetables) and dietary patterns (amount).

Conclusions Our findings are mostly in line with how the Dutch dietary guidelines are communicated ("product level"). However, laypersons primarily mention separate aspects instead of naming the guidelines as a whole. Health policymakers can use this insight in future communications regarding guidelines to the general public. A challenge for future (eHealth) diet interventions is how to implement and tailor dietary information that optimally connects with the perceptions of the target population.

Background

Unhealthy dietary patterns are highly prevalent in Western countries, and they have been associated with depression, hypertension, heart diseases, cancer, diabetes type 2 and obesity [1]. As a consequence, the promotion of a healthy dietary intake is of great importance to public health. The small effect sizes, limited sustainability of effects and high drop-out rates that are usually found for existing online diet interventions, show that there is room for improvement in this field [2, 3]. One way to make dietary interventions effective is by making them individualised or tailored [4]. This study focuses on how people define a healthy diet and the preferred ways to eat healthily, as this insight can help to develop better interventions optimally tailored to the individuals in a target population.

National and international dietary guidelines provide advice and principles on how to meet healthy nutritional patterns to maintain health and reduce the risk of disease. However, most adults in the Western world do not comply with these recommendations [5, 6]. The Netherlands Nutrition Centre has

translated the guidelines provided by the Health Council of the Netherlands into a practical visual tool "wheel of five" to give examples of healthy dietary patterns for the general public [7]. A description of these five food groups can be found in Table 1. The wheel of five has mainly been formulated in terms of products that a person can consume, making it easier for consumers to choose healthier products.

Table 1
Short overview of the Dutch guidelines for adults

Food group	Recommendations daily amounts[a]
1. Vegetables and fruit	250 grams of vegetables 200 grams of fruit
2. Spreading and cooking fats	35–65 grams
3. Dairy, nuts, fish, legumes, meat and eggs	1 portion of fish[b]/meat/legumes 25 grams of unsalted nuts e.g. 40 grams of cheese
4. Bread, grain/cereal products and potatoes	4–8 slices of whole grain bread 4–5 serving spoons of whole grain product or 4–5 potatoes
5. Drinks	1.5–2 litres of drinks (without sugar)
Note. More detail regarding the Dutch guidelines can be found in Brink and colleagues (2016) [7].	
[a] Numbers are dependent on sex.	
[b] It is advised to consume fish at least once a week.	

Researchers and nutritionists have a scientific quantified definition and understanding of what healthy eating entails; which have been operationalised as guidelines and for which portion sizes have been provided. However, is this understanding of a healthy diet also apparent with the general population? This could be doubted, as they are constantly being confronted with a wide variance of nutritional information, both proven as well as unproven health claims. Besides, while people may have intentions to eat (more) healthily, many do not succeed [8, 9]. This may not very surprising since eating healthily is typically seen as a set of challenging and complex behaviours [10]. For this purpose, it is essential to examine what people perceive as a healthy diet, whether this is in line with the recommendations and how people prefer to eat healthily as this may help interventions aimed at promoting healthy eating. Research on the current perceptions of a healthy diet in the population (Dutch adults) is so far limited, and it, therefore, is the aim of this study.

Until now, several studies have addressed the perceptions of a healthy diet. However, most of these studies were conducted over 20 years ago. One large pan-European study grouped participants'

perceptions into eight major categories that captured healthy eating. These categories were less fat (49%), more fruit and vegetables (42%), balance and variety (41%,), fresh/natural foods (28%), less (red) meat (18%), nutrient approach (16%) fewer staples/fibres (16%), and less sugar (11%) (the percentages represent the weighted number for the European Union) [11]. Another study found that more fish and more lean meat were also part of the healthy eating definition in a large Spanish sample [12]. A more recent study found that low-educated Dutch, Turkish, and Moroccan adults living in the Netherlands considered mainly fruit and vegetables as part of a healthy diet [13]. Thus, fruit, vegetables, (avoiding or limiting) meat, balance/variety/moderation, and less fat seem to constitute a healthy diet according to many consumers; these elements were also identified by a review [14]. These elements are also consistent with parts of dietary guidelines, but these descriptions are less detailed than the actual guidelines. Scientific studies and new insights have expanded considerably in the last decades, and nutritional recommendations have evolved to keep pace with the latest findings and with the changing patterns in food consumption [15]. Researchers and nutritionists are thus aware of what a healthy diet constitutes. But is the current average consumer's perception in line with these ideas (i.e. guidelines)? Perhaps surprisingly, research on the current perceptions of a healthy diet in the population remains scarce.

A better understanding of what Dutch consumers perceive as a healthy diet (and how this relates to the current Dutch guidelines) and their preferences for how to eat (more) healthily is an important consideration for the development of tailored interventions aimed to help people adopt changes in their dietary behaviour. This insight can be used to make interventions more effective in the following way. Firstly, for choosing the target behaviours of the intervention (e.g. fruit intake) for evaluation purposes. Secondly, tailor information regarding the dietary guidelines to the needs of the user. Thirdly, use the language that the consumers use, so that they feel more related to the intervention. On a higher level, this study provides input for health policymakers. Namely, to bring to their attention what information about specific food groups is missing or what misperceptions are present that can be tackled in future communications regarding guidelines. The aims of this pilot study were: 1) to identify what Dutch adults perceive as a healthy diet, and 2) to examine what they perceive as the preferred ways to eat more healthily.

Methods

Design, participants, and procedure

This study primarily used a qualitative design. We aimed to recruit at least 50 Dutch-speaking adults who were at least 18 years old using a short advertisement on social media (Facebook) between July and August 2017 [16]. This advertisement contained a colourful image of healthy food and a message asking for people's opinion on healthy food and stating that they could win a gift voucher worth 20 euros. People who were interested in participating could click on the link to the study website containing more information about the study. Subsequently, they could enrol in the study by filling in an online consent form. Participants were then able to proceed to the online questionnaire, which lasted maximally fifteen

minutes to complete. As an incentive for participation, respondents who completed the questionnaire were entered into a raffle for a gift voucher. The study was approved by the ethical committee of the Open University of the Netherlands (reference number: U2018/07266/SVW).

Instrument

A short online questionnaire was created to assess participants' perceptions of a healthy diet. To assess what people consider as healthy eating and how they would prefer to eat healthily, two open-ended questions were asked. Questions that were asked were: "what do you perceive as healthy eating (in terms of products, amounts, preparation etc.)" followed by "how would you prefer to eat healthily?". Participants could answer these questions in an open text field with no word count restrictions. In addition to these open-ended questions, participants had to select maximally four dietary practices among 24 predefined possibilities about how they would like to eat healthily. These dietary practices were based on dietary recommendations, such as eating more vegetables, as well as marketing hypes, for example, eating superfoods. Participants also reported their age, gender, highest level of education completed, weight (optional) and height. Furthermore, participants also rated how important healthy food was for them on a Likert-scale ranging from 1 (not important at all) to 10 (extremely important). Completing the questionnaire took maximally 20 minutes.

Data Analysis

The responses to the open-ended questions were analysed using conventional content analysis, aiming to create categories of healthy eating [17]. A coding tree was developed based directly on the text data in the following way.

Data preparation. First, all data were inspected by the lead author and AE for an overall understanding and identification of categories, also based on previous literature [7]. Furthermore, clear type errors were corrected, e.g. began was corrected to vegan.

Development of coding scheme. The answers were read word by word and were split into meaningful segments ("codes") that appeared to capture key thoughts or concepts. For example, the response "Healthy food consists of a good balance between different nutrients (fat/carbohydrates/proteins) and contains sufficient vitamins and minerals (participant 63)" was segmented in "Healthy food consists of a good balance", "different nutrients", "fat", "carbohydrates", "proteins", "(sufficient) vitamins" and "minerals". Coloured tags were then used to organise the responses into categories, such as nutrients or carbohydrates. Upon further inspection of the data, concept categories were refined to optimally fit the data. These preliminary categories were discussed with LL, CB and AO and an initial categorization scheme was developed.

Procedure of coding. Two graduate psychology students (YR and MD) were directed to also split the answers of the respondents' responses into meaningful segments. They then used the initial coding scheme to identify to which category each segment belonged. The initial inter-rater reliability was 93.4% for how participants defined a healthy diet and 91.9% for the way how to eat (more) healthily.

Discrepancies were discussed with JC and revisions in the categorization styles were made until full consensus was achieved. After the categorization process had been completed, further higher-order categories (e.g. dietary patterns, food processing, food product, content/nutrient and other) were identified to construct a broader definition of healthy eating. We retrieved the frequency and percentage of each (higher) category, also for the closed-ended question that the participants to select several options among a predefined list of ways to eat (more) healthily, and it was calculated by how many participants (%) each unique category was mentioned. The results of the questionnaire were not returned to the participants for feedback. Excel was used for qualitative analyses. Furthermore, we filled in the Standards for Reporting Qualitative Research (SRQR) to report important aspects of the study (Supplementary File) [18].

Results

Descriptive Statistics

In total, 78 Dutch adults (51 females, 65%) enrolled in this study. Age varied between 18 and 68 years (M_{age} = 38.4 years, SD_{age} = 15.5). Almost half of the respondents (n = 43, 55%) had completed higher-level professional education, university or postgraduate studies, while 20 respondents (26%) had graduated from high school (havo or vwo) or had a degree in middle professional education. Fourteen respondents (18%) had no education beyond primary school, graduated from lower-level secondary education or had completed lower professional education. One responder replied with “other education”. The mean BMI of the sample was 23.3 ± 4.1. Of this sample, four respondents (5%) were classified as underweight, 51 (68%) as having a normal weight, 15 (20%) as non-obese overweight and 5 (7%) as obese. Three respondents did not fill in their weight. The mean importance of a healthy diet for this sample was 8.3 ± 1.4 (scale range 1–10).

What Is Healthy Eating?

Four major categories and a residual category were constructed that constitutes phrases defining healthy eating in this sample. The largest category “food products” consisted of drinks, fish, fruit, grain products, meat, nuts, specific food products (i.e. products that could not be grouped in the other food product categories) and vegetables. The second largest “content/nutrients” contained the categories: calories, carbohydrates, fat, fibres, nutrients, protein, salt, vitamins/minerals. This major category was followed by “food processing” that consists of two categories: preparation and sustainable foods. The following major category was “dietary patterns” consisting of four categories: type of eater, amount, balanced and recommendations. The smallest major category was “other” containing other (or segments that could not be classified in the other categories), hype/claims, and lifestyle. See Table 2 for an overview of all (major) categories that were identified, presented with the frequencies and percentages, calculated based on all meaningful segments mentioned by all participants (fourth column) and how often each unique category was mentioned by participants (fifth column). From all segments given, most belonged to the following

categories: vegetables, biological/sustainable, fruit, preparation, carbohydrates, fat, amount and balanced. The least occurrent categories were hype/claims (“other”), calories (“content/nutrient”), grain products (“food product”), type of eater and recommendations (“dietary patterns”).

Table 2
Overview of the categories on what is healthy eating.

Major categories (*n*, %)	Categories	Examples	FrEq. (answers; %)[a]	FrEq. (pp. %)[b]
Dietary patterns (52, 12.5%)	Balanced	Varied; Balanced	22 (5.3)	19 (24.4)
	Amount	Right amount; Moderated	21 (5.1)	19 (24.4)
	Recommendations	Wheel of five	5 (1.2)	5 (6.4)
	Type of eater	Vegetarian; Vegan	4 (1.0)	4 (5.1)
Food processing (79, 19.0%)	Biological/ sustainable	Unprocessed; Biological	42 (10.1)	31 (39.7)
	Preparation	Healthy preparation; Fresh	37 (8.9)	27 (34.6)
Food product (148, 35.7%)	Vegetables	Vegetables; Legumes	46 (11.1)	42 (53.9)
	Fruit	Fruit	39 (9.4)	39 (50.0)
	Meat	Not too much meat; Chicken	15 (3.6)	14 (18.0)
	Drinks	A lot of water; Herb tea	13 (3.1)	11 (14.1)
	Nuts	Nuts; Seeds	12 (2.9)	8 (10.3)
	(Specific) food products	Eggs; Dairy	11 (2.7)	10 (12.8)
	Fish	Fish	7 (1.7)	7 (9.0)
	Grain products	Bread; Grains	5 (1.2)	5 (6.4)
Content/Nutrient (116, 28.0%)	Carbohydrates	Fast carbs; No sugar	32 (7.7)	18 (35.9)
	Fat	Good fats; Low in fat	27 (6.5)	25 (32.1)
	Fibres	Rich of fibres	15 (3.6)	15 (19.2)

Note. Owing to rounding, percentages do not always add up to 100%.

[a] In this column it can be found how often this category was mentioned of all answers ($n = 415$).

[b] In this column it can be found by how many participants a particular category was mentioned ($n = 78$).

Major categories (*n*, %)	Categories	Examples	FrEq. (answers; %)[a]	FrEq. (pp. %)[b]
	Salt	Little salt	14 (3.4)	14 (18.0)
	Vitamins/minerals	Vitamins	10 (2.4)	10 (12.8)
	Nutrient	Nutrients; Nutritional value	7 (1.7)	7 (9.0)
	Protein	Proteins	7 (1.7)	7 (9.0)
	Calories	Few calories	4 (1.0)	4 (5.1)
Other (20, 4.8%)	Lifestyle	Exercising	10 (2.4)	10 (12.8)
	Other	Development in food industry	8 (1.9)	8 (10.3)
	Hype/claims	Don't follow hypes	2 (0.5)	2 (2.6)

Note. Owing to rounding, percentages do not always add up to 100%.

[a] In this column it can be found how often this category was mentioned of all answers (*n* = 415).

[b] In this column it can be found by how many participants a particular category was mentioned (*n* = 78).

How To Eat Healthily?

The same four major categories and a residual category could be applied to the categories of how to eat healthily. Here, the largest category was "food processing" that consists of two categories: preparation and organic foods. The second-largest major category was "food products" consisted of dairy, drinks, fish, fruit, grain products, meat, nuts, products, snacks ("less snacks"; this was not found in what is healthy eating) and vegetables. This major category was followed by "dietary patterns" consisting of five categories: type of eater, amount, balance, eating pattern and recommendations. The following major category was "content/nutrients" that contained the categories: calories, carbs, fat, fibres, nutrients, protein, salt, vitamins/minerals. The smallest major category was "other" containing segments that could not be classified in the other categories, hype/claims, and lifestyle. See Table 3 for an overview of all (major) categories that were identified for how to eat (more) healthily, presented with the frequencies and percentages, calculated based on all phrases (*N* = 197) and how often each unique category was mentioned by participants. We found that segments that belonged to the preparation category were mentioned most often, i.e. about 40% of this sample mentioned concepts belonging to this category. From all segments given, most belonged to the categories: preparation, balanced, vegetables, and biological. The least occurrent categories were nuts, dairy ("food product"), protein ("content/nutrients") and environment ("other").

Table 3
Overview of the categories how to eat (more) healthily

Major categories (*n*, %)	Categories	Examples	Frequencies (answers; %)	Frequencies (pp; %)
Dietary patterns (49, 24.9%)	Balance	Varied	21 (10.7)	21 (26.9)
	Amount	Moderated; Small portions	12 (6.1)	12 (15.4)
	Type of diet/eater	Vegan or vegetarian	7 (3.6)	7 (9.0)
	Eating pattern	Six fixed eating occasions	7 (3.6)	7 (9.0)
	Recommendations	Advice; Wheel of five	2 (1.0)	2 (2.6)
Food processing (59, 30.0%)	Preparation	Stir fry; Prepare yourself	43 (21.8)	31 (39.7)
	Biological/organic	Natural products	16 (8.1)	14 (18.0)
Food product (54, 27.4%)	Vegetables	A lot of vegetables	16 (8.1)	16 (20.5)
	(Healthy) products	Healthy products	9 (4.6)	9 (11.5)
	Fruit	Fruit	7 (3.6)	7 (9.0)
	Snacks	No snacks	7 (3.6)	7 (9.0)
	Grain products	Less bread; Multigrain products	5 (2.5)	5 (6.4)
	Meat	No or less meat	4 (2.0)	4 (5.1)
	Drinks	Smoothie	2 (1.0)	2 (2.6)
	Fish	Fish	2 (1.0)	2 (2.6)
	Nuts	Nuts	1 (0.5)	1 (1.3)
	Dairy	Dairy	1 (0.5)	1 (1.3)
Content/Nutrient (19, 9.6%)	Carbs	Decrease sugar intake	9 (4.6)	9 (11.5)

Note. Owing to rounding, percentages do not always add up to 100%.

[a] In this column it can be found how often this category was mentioned of all answers ($n = 197$).

[b] In this column it can be found by how many participants a particular category was mentioned ($n = 78$).

Major categories (*n*, %)	Categories	Examples	Frequencies (answers; %)	Frequencies (pp; %)
	Fat	Less fat; Healthy fat	5 (2.5)	5 (6.4)
	Nutrients	Nutritional values	2 (1.0)	2 (2.6)
	Calories	Calories	2 (1.0)	2 (2.6)
	Protein	Rich of proteins	1 (0.5)	1 (1.3)
Other (16, 8.1%)	Shopping	Groceries shopping; Buying	8 (4.1)	8 (10.3)
	Other	Keep it simple	5 (2.5)	5 (6.4)
	Information	Gain knowledge	2 (1.0)	2 (2.6)
	Environment	At the table	1 (0.5)	1 (1.3)
Note. Owing to rounding, percentages do not always add up to 100%.				
[a] In this column it can be found how often this category was mentioned of all answers (*n* = 197).				
[b] In this column it can be found by how many participants a particular category was mentioned (*n* = 78).				

Preferred Ways Of Eating Healthier

Participants also had to select four options that represented their preferred way of eating healthy among predefined categories. These results are presented in Fig. 1. We found that eating more vegetables was chosen by more than half of the participants as a preferred way to eat (more) healthily (*n* = 42, 54%). Furthermore, cooking with fresh ingredients (*n* = 32), drink more water (*n* = 28), and limit fat intake (*n* = 22) were considered to be other preferred ways to practice a healthy diet.

Note

Percentages after the bars indicate the percentage of participants that chose that particular answer. SSBs are sugar-sweetened beverages. Not all participants always chose four options as a way to eat (more) healthily.

Discussion

In this study, it was examined what Dutch adults perceive as a healthy diet and what their preferred ways to eat (more) healthily are. Although small differences were present, a large variety but similar categories

(N = 25) have been identified for what people perceive as a healthy diet as well as the preferred ways how people would like to eat (more) healthily (N = 26). These categories could further be grouped into four higher-level categories and a residual category: dietary pattern, food processing, food product, nutrients and other.

The results showed that how people perceived a healthy diet was mostly represented at the level of food product (vegetables and fruit) and the content/nutrient level (carbohydrates); whereas how they would like to eat healthily was mostly represented at the level of food processing (processing), food product (vegetables) and dietary patterns (amount) [7, 19]. This is in line with previous studies in which many participants named fruit and vegetables as part of a healthy diet [11–13]. A striking finding was that only five participants explicitly called the Wheel of Five as how they would describe a healthy diet. A previous study has identified that about 85% of the Dutch people reported having heard of the Wheel of Five [20]. Even though participants in our sample may, to some degree, be aware of those guidelines, this does not entirely seem to represent their ideas of a healthy diet. Another remarkable finding was the frequent occurrence of the way how the food was prepared (“freshly prepared instead of ready-made meals”) and whether it was organic (“biological”). Latter result is especially interesting since there seems to be a (mis)perception that organic food is always more healthily than conventional foods. Several reviews found no evidence of a difference in nutrient quality between organic and conventional foods; however, consuming natural foods may lower exposure to pesticide residues and antibiotic-resistant bacteria [21, 22]. On the other hand, it has been found that organic food has been linked to a lower risk of overweight/obesity [23]. This may be due to an overall healthier lifestyle of consumers who regularly buy organic foods; they are more likely to buy more vegetables, fruit, whole grain products and less meat, and are also likely to be more physically active and less likely to smoke [23, 24]. Lastly, this study showed that people are generally inclined to think about food products instead of nutrients. People may not necessarily think about what makes particular food healthy. This corresponds to how the Dutch guidelines for a healthy diet have been communicated by the Netherlands Nutrition Centre: almost wholly in terms of food products (and dietary patterns, such as amounts), as this relates better to recent scientific developments and food choices as perceived by the general public [7]. Additionally, most answers within the content/nutrient category contained statements regarding fat/carbohydrates, showing that the lowering of intake of foods that are high in fat and sugar are perceived as important for eating (more) healthily.

Our study further illustrates that how our participants define a healthy diet does not necessarily correspond to how they would like to eat (more) healthily. Although similar categories were identified, how one would like to eat (more) healthily was described in a slightly different way. It seems that the perception of what a healthy diet entails is more based on the food product level, which corresponds to the guidelines. On the other hand, how to eat healthily appeared to be more diverse as it was linked to products (product category itself, such as vegetables as well as the way products are “produced”, such as organic) and to ways how to prepare healthy food. The dietary guidelines were only mentioned by a few participants. Although many participants may be aware of the Wheel of Five, they only seem to think about several aspects of the guidelines instead of the guidelines as a whole. When people have to select

several options among an extensive list of ways to eat (more) healthily, we see a similar pattern. In essence, more than half of the sample preferred eating vegetables as a way to eat (more) healthily and cooking with fresh ingredients. They also selected drinking more water and limit fat intake quite frequently. However, these ways were mentioned less often in the open-ended questions. This might be due to that people recognize these options as healthily but do not necessarily name them in the open-ended questions. Even though the consumption of water (or sugar-free drinks such as tea or coffee) was not necessarily within the scope of this study, it is an essential part of a healthy diet according to the guidelines. Participants in our study seem not to think about this when asked how they would define a healthy diet. In general, the perceptions of the participants about what concerns a healthy diet and how to eat healthily are somewhat in line with the “wheel of five”. But laypersons are inclined to name only certain aspects of the guidelines instead of calling them as a whole; even when the participant’s full combined answers were taken into account.

Some limitations of this study should also be noted. Since food intake was not assessed in this sample, we are not able to link eating behaviour to perceptions of a healthy diet. More research is needed on how these perceptions affect food choices. A second limitation was the use of self-selection sampling. People could take part on their own accord. This may have resulted in a highly educated sample and (maybe as a consequence) an overrepresentation of people with a healthy weight and who perceived a healthy diet as quite important. This may limit generalisability to the general population. However, participants in the dietary intervention for which this pilot study has been conducted can also take part in their own accord. Therefore, it is expected that these results represent the targeted intervention population to some extent. Future studies could examine whether the categories we have identified for the definition of a healthy diet and ways to eat (more) healthily hold in a larger and more diverse sample with especially people with overweight and with low education levels. These people eat less healthily and may, as a consequence, have different perceptions of what a healthy diet entails or vice versa [25].

This study also has important theoretical and practical implications. This study did not only provide a more recent view on how some Dutch adults experience and describe components of a healthy diet but also determined the preferred ways to eat healthily in their own words. It is demonstrated that information about a healthy diet does not fully correspond to one’s preferences on how to eat more healthily. This finding has important implications for developing dietary interventions. By giving people the option to choose for themselves what behaviour to work on within an intervention, a behavioural change could be promoted. This change could be enhanced even further when consumers’ terminology is used. In this sense, a form of relatedness is created that promotes more autonomous types of motivation to eat healthily, and in turn, stimulates behavioural change [26]. Furthermore, these findings demonstrate that it is important to provide an overview of the guidelines within an intervention, as most participants in this pilot study do not mention all aspects of the guidelines. But some of these aspects can be recalled (e.g. water consumption). Participants then can make an informed choice on what behaviour they would like to work on. Another implication might be that some aspects of the guidelines may need some extra attention as they can be recognized but not recalled. For example, the consumption of water is frequently chosen in the closed-ended question as ways to engage in a healthier diet, but this has not often been

named in the open-ended questions. Health policymakers can strengthen active recall by bringing the consumption of certain healthy food products such as water, more to the attention of the general population.

Conclusion

In conclusion, how people define a healthy diet does not fully correspond to how they would like to eat more healthily. Nevertheless, the perceptions of healthy eating are influenced by some dietary principles (e.g. the consumption of vegetables and fruit). However, participants do not mention quantities/sizes and only name some aspects of the guidelines in general. Other elements that also seem important to people's perceptions of healthy eating, such as how the food is prepared, whether it is organic, and limiting sugar and fat intake, are not explicitly named in current dietary guidelines. Our results also suggest the need to improve nutritional education or strengthen recall about certain healthy food products, such as the consumption of water. For future dietary guideline updates and especially the communication about them to the public, it is essential that these guidelines better match the perceptions of the population (or vice versa). One of the challenges for self-determined (eHealth) interventions for dietary behaviour is how to implement and tailor this information to optimally connect to the target population, as everyone has their perceptions of a healthy diet and preferred ways to eat (more) healthily.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the Committee for Ethics and Consent in Research of the Open University of the Netherlands (reference number: U2018/07266/SVW). Participants provided written informed consent to participate in the study.

Consent for publication

Not applicable.

Availability of data and materials

The study data and materials of this study are available upon request.

Competing interests

None declared

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Authors' contributions

JC wrote the manuscript and conducted the analyses; LL and JC had the idea for the study; All authors have primary responsibility for final content. All authors were responsible for critical revisions and final approval of the manuscript.

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Figures

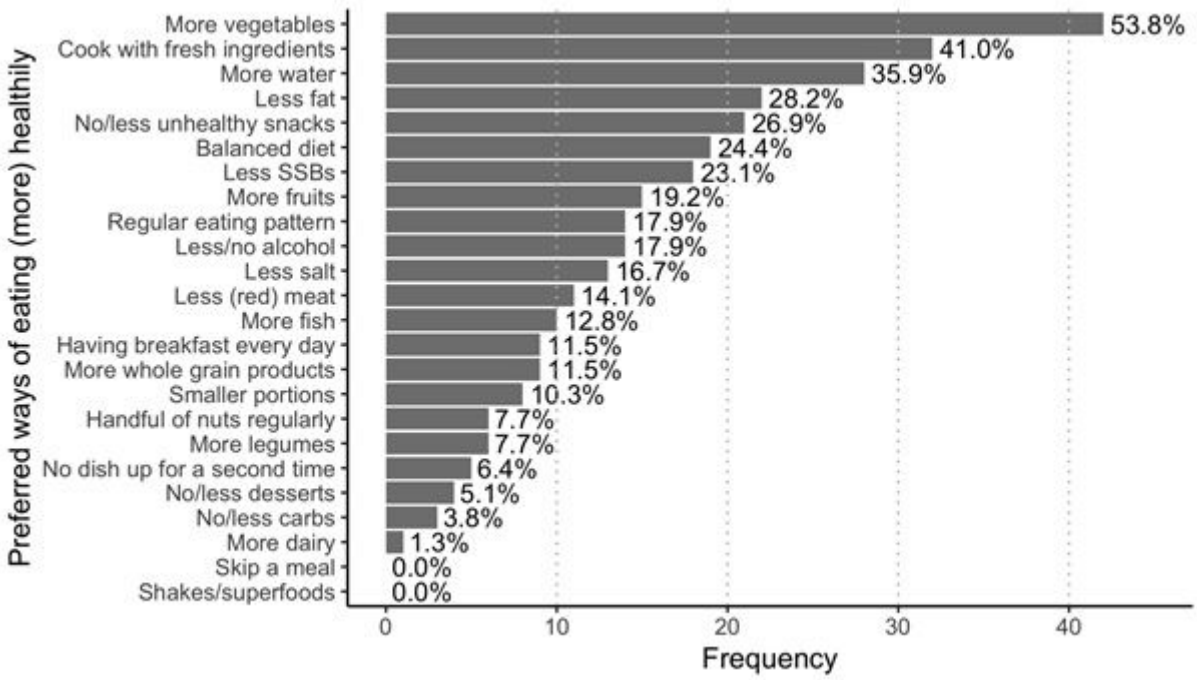

Figure 1

Overview of the preferred ways to practice a healthy diet based on the selection among predefined categories. Note. Percentages after the bars indicate the percentage of participants that chose that particular answer. SSBs are sugar-sweetened beverages. Not all participants always chose four options as a way to eat (more) healthily.

Supplementary Files

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