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**Employees' expectations of internet-based, work-place interventions promoting the Mediterranean diet: a qualitative study**

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## **Abstract**

**Objective:** Explore employees' perceptions of ability to follow the Mediterranean diet (MedDiet), preferences for setting goals if asked to follow the MedDiet, and expectations of an internet-based, work-place MedDiet intervention.

**Design:** Seven focus groups to guide intervention development.

**Setting:** Four workplaces (business/professional services, government branches) in South-West England.

**Participants:** Employees (n=29, 51.7% women), aged 24-58 years.

**Phenomenon of interest:** Ability to follow the MedDiet; preferences for goal setting if asked to follow the MedDiet; intervention content.

**Analysis:** Data were analysed using thematic analysis.

**Results:** Participants perceived that adhering to some MedDiet recommendations would be challenging and highlighted cost, taste and cooking skills as adherence barriers. Behaviour change preferences included a tailored approach to goal-setting, reviewing goal progress via a website/smartphone app and receiving expert feedback via an app/website/text/face-to-face session. Desirable features of an internet-based MedDiet application included recipes, interactivity, nutritional information, shopping tips, cost-saving information and a companion smartphone app. Engaging social support was deemed important to facilitate adherence.

**Conclusions and implications:** An internet-based, work-place MedDiet intervention should address adherence barriers, utilise a tailored approach to setting and reviewing goals and activate social support to facilitate adherence. These findings provide insights to planning to promote the MedDiet in non-Mediterranean regions.

(Abstract word count: 200 words)

**Key words:** Mediterranean diet; workplace intervention; qualitative methodology; adults

## INTRODUCTION

A large proportion of adults in the United Kingdom (UK) do not meet national dietary guidelines.<sup>1</sup> The Mediterranean diet (MedDiet), rich in olive oil, fruits, vegetables, wholegrain cereals, legumes and nuts, containing moderate amounts of low-fat dairy products, fish and alcohol, and low amounts of red meat and meat products<sup>2</sup> could provide an appealing way to promote healthy eating in the UK, due to its high palatability and documented ease of transferability to populations residing in non-Mediterranean countries.<sup>3,4</sup> The need to promote the MedDiet in the UK has recently been recognised by the European Union, which invited all Member States to ‘promote healthy eating, emphasising health promoting diets, such as the MedDiet’.<sup>5</sup>

Utilising internet technology to deliver an intervention and focusing on work-places as an intervention setting might offer an advantageous route to promoting the MedDiet. Approximately 87% of UK adults had used the internet in the first quarter of 2014,<sup>6</sup> indicating the internet’s potential to reach large numbers of adults. Work-place settings offer a good alternative to other settings since they offer access to large numbers of adults, opportunities for repeated assessments<sup>7</sup> and existing organisational structures for intervention delivery and social and environmental support.<sup>8</sup> A recent systematic review indicated that internet-based work-place interventions hold promise in improving dietary behaviours among adults.<sup>9</sup>

The UK Medical Research Council (MRC) provides a framework for the development and evaluation of complex interventions, a key component of which is the developmental stage, in which the intervention is developed based on formative research.<sup>10</sup> Identifying the intervention needs of the target population and incorporating them during intervention development is critical for the acceptability and feasibility of an intervention.<sup>10</sup> Closely related to the increased effectiveness of a dietary intervention is the use of

established behaviour change techniques, such as goal setting, self-monitoring, barrier identification, relapse prevention, reinforcement and social support,<sup>11</sup> while providing tailored feedback on theoretically-derived psychosocial determinants of dietary behaviour has been suggested to improve motivation for dietary change in internet-based interventions.<sup>12</sup>

Commensurate with the MRC framework, this study describes the developmental stage of an internet-based intervention to promote the MedDiet in work-place settings in South West England. We have recently shown, in a cross-sectional study, a moderate overall adherence to the MedDiet among adult employees in South West England.<sup>13</sup> Nevertheless, few employees achieved high adherence to the MedDiet recommendations for legumes, fish, dairy products, red meat, poultry and olive oil,<sup>13</sup> suggesting that improvements in some dietary behaviours are needed to increase overall adherence. The current report follows-up from this earlier work,<sup>13</sup> and aims to qualitatively explore this population's: a) perceptions of ability and barriers to follow the MedDiet; b) preferences for setting and reviewing goals to adopt the MedDiet, and receiving feedback on achievement of 'MedDiet goals' if they participated in an intervention promoting the MedDiet and; c) expectations of an internet-based, work-place MedDiet intervention, should such an intervention took place in their work-place.

## **METHODS**

### **Study Design and Participants**

Semi-structured focus groups were conducted in May 2014 with employees of four work-place settings in South West England. The study was approved by the Research Ethics Committee of the School for Policy Studies, University of Bristol. Details of work-place recruitment procedures and participant

eligibility criteria are reported elsewhere.<sup>13</sup> In summary, 590 healthy adults, employees of four work-place settings (one company engaged in business and professional services and three local government branches) in South West England (Bristol, South Gloucestershire and Wiltshire) completed an online survey to assess demographic characteristics, internet usage patterns and adherence to the MedDiet<sup>13</sup> and were asked to indicate their willingness to take part in a focus group. A total of 231 (39.1%) employees expressed an interest and were sent an information sheet. Participants were purposively recruited into focus groups within work-places to achieve a sample comprising both males and females and variation in individual level of MedDiet adherence (low, moderate, high, as indicated by a previously described MedDiet score).<sup>13,14</sup> Focus groups were conducted until saturation was reached. Participants provided written informed consent and received a £10 gift voucher in recognition of the time spent in the study.

### **Focus Group Discussions**

A semi-structured focus group guide (available from the corresponding author) was developed by the researchers that allowed the exploration of participants' perceived ability to follow the MedDiet in the UK. The focus group also assessed their preferred method to set, review and receive feedback on dietary goals if asked to follow the MedDiet in an intervention setting, their suggestions on the type, frequency and delivery method of information provided when facing difficulties in achieving set goals and adhering to the MedDiet. At the end of the focus groups participants were asked about their expectations of a web-based MedDiet application and facilitators/barriers to its use, as well as desired components of a work-place MedDiet intervention, should such an intervention take place in their work-place. During data collection, the MedDiet pyramid (presenting information on the types and amounts of foods recommended in the MedDiet)<sup>15</sup> was presented, discussed and was available to participants to guide the discussion. The sequence and wording of the questions were modified to explore emerging themes.

Seven focus groups were conducted at participants' workplace by two members of the research team who were experienced and trained to conduct focus groups. Focus groups contained between 3 and 5 participants and lasted on average 71 minutes (range 60-82 minutes). One of the researchers acted as an observer and took detailed notes and summarised the discussion points at the end of each focus group to confirm accuracy of notes with participants. The focus groups were audio recorded, transcribed verbatim and anonymised. Two researchers listened to the recordings independently to check for accuracy with the transcriptions and any differences were reconciled. Transcripts were also compared with the observer's detailed notes to verify their credibility. Data collection and analysis proceeded in parallel, so that data collection was finalised when saturation was deemed to have been reached (i.e. data captured a range of perceptions and variation of responses of participants and no new themes were emerging from the analysis).

### **Data Analysis**

Descriptive statistics (means, SD, n and % with exact *p* values) were used to present demographic characteristics and MedDiet adherence of participants. Independent samples t-tests and Chi-square tests were used to investigate differences between participants who took part in the focus groups and those who did not. These analyses were performed using SPSS (IBM SPSS for Windows, version 21, Armonk, NY: IBM Corp).

Deductive thematic analysis<sup>16</sup> of the focus groups transcripts was conducted by three trained researchers. Coding and analysis proceeded in parallel. Each researcher independently and extensively read the transcripts and annotated them to identify a priori (via deductive coding) and emerging themes and form a preliminary codebook.<sup>17</sup> Comparing emerging themes with those already coded allowed the refinement of themes and clarification of sub-themes in order to understand participants' perceptions and preferences.<sup>18</sup>

The codebook was provisionally tested for inter-reviewer reliability with a sample of three transcripts by these researchers, who discussed discrepancies and refined the codebook. There was 90% agreement on coding, as assessed by the number of agreements divided by the sum of agreements and disagreements. All transcripts were imported into NVivo (Version 10.0, QSR, Southport, UK), which facilitated the comparison of similarities and differences within and between the focus groups, and the examination of patterns in the views of males and females and by MedDiet adherence, according to each theme. Emerging themes and sub-themes are illustrated by representative quotations from participants (indicated as male (M)/female (F) and moderate (MA)/high (HA) MedDiet adherence). These were selected to best reflect the diversity of responses.

## **RESULTS**

### **Participants**

Seven focus groups were conducted with 29 adults (13% participation rate; 15 women, 14 men, ranging in age between 24 and 58 years ( $M = 42.6$ ;  $SD = 9.5$ ). Participant characteristics are shown in Table 1. Participants' mean MedDiet score was 33.6 ( $SD = 3.3$ ), indicating moderate adherence.<sup>14,19</sup> There was no evidence of differences in demographic characteristics, total MedDiet score (33.6 vs. 33.8,  $t = .26$ ;  $p = .59$ ) or proportion of participants having moderate and high adherence to the MedDiet (59 vs. 61% and 38 vs. 39% respectively,  $\chi^2 = .98$ ;  $p = .07$ ), between participants who took part in the focus groups and those who did not. This paper reports on five deductive themes identified that would need to be considered during the development of an internet-based work-place intervention to promote the MedDiet.



## Perceived Ability to Follow the MedDiet

None of the participants reported purposefully following the MedDiet. Some participants believed that their current dietary habits, particularly the use of olive oil, wholegrain cereals and vegetables, resembled the MedDiet recommendations: *“The summer Mediterranean salads... I eat lots and lots of it”* (F/MA). However, legumes, nuts, fish, meat and meat products and low-fat dairy were commonly perceived to be difficult to adhere to, and some believed that using olive oil would be challenging: *“I don’t know anybody who would go out and buy nuts as a snack”* (M/MA). The most commonly reported perceived barriers to adhering to the MedDiet recommendations for these foods were lack of cooking skills (*“I don’t even know how you cook lentils if I’m honest...”*, F/HA), cost (*“I wouldn’t be able to sustain two servings of fish a week just because of the cost...”*, F/HA), taste, habits and cultural differences (*“we would have been brought up a different way to what the MedDiet would suggest to have”*, F/MA) and family preferences (*“...I can’t get my husband to eat fish... he loves his red meat...”*, F/MA). Some participants expressed a concern about the impact that adhering to the MedDiet would have on caloric intake and body weight (*“... if I started having nuts every day and olive oil with every meal I think I’d put on a lot of weight”*, F/MA). Although participants largely embraced the possibility of attempting to follow the diet, they acknowledged that time management to prepare Mediterranean meals would be a barrier: *“... it’s the actual hard work of planning it...”* (M/MA). Although not a common view, one participant thought that the MedDiet recommendations were in conflict with the dietary guidelines of which they were aware, suggesting the importance of providing trustworthy information: *“... there’s quite a bit of conflict in there about how to have all of those portions of things whilst still maintaining what I have been taught is a healthy diet to have”* (F/HA). Some participants were confident that they would be able to change their whole diet to a more Mediterranean one or select MedDiet elements they would like to change, while others preferred a step-by-step approach to change: *“... doing a little change and then a little change becomes the big*

*change because doing... change a to b I've found that difficult to do whereas if I modify things ever so slightly but you stick to it then you can gradually move across and change a habit” (M/HA).*

### **Setting Goals to Follow the MedDiet**

Participants consistently reported a desire to set their own goals (“... *I prefer setting my own goals... mainly because I know myself...*”, F/MA) but held diverse views on whether they wanted help in setting their goals from a health professional. Some questioned whether diet was a priority topic appropriate to discuss with a health professional: “*I don't think I would ever go to a health professional and say I'm going to adopt this diet what do you think I should do... I'd feel I was wasting their time to speak about a diet...*” (M/HA). However, others desired support, especially when goal pursuit was difficult: “*It would be nice to know you had someone to kind of go “I'm a bit stuck”... it is quite a personal thing*” (F/HA). Some expressed the opinion that setting specific, rather than generic goals, and having tangible outcomes, would increase the likelihood of adopting the MedDiet: “*The goal has to be a realistic target... needs to be measurable and specific... to increase from one portion of fish to two a week. That's something that you can measure and you can see if you're doing it... you will have more success*” (M/MA). Involving their social environment in the goal setting process was also perceived to increase encouragement to adopt the diet by some: “*I'd have to sit down with my husband and do it together as a household because I'm not cooking two different meals... I need support with these sorts of things... it makes it easier... from a household perspective I think you need everybody on board...*” (F/MA). Participants consistently reported that they wanted to be able to change their goal, and have a flexible timeframe to achieve their goal, as they felt this would help them persevere in their efforts: “*You lose heart don't you if you're not achieving something because of whatever it is that might be wrong for you at that particular time... I think you should have the opportunity... to be more flexible and look at maybe a slightly different goal*” (M/MA).

## Reviewing Goals and Receiving Feedback on Goal Attainment

The most preferred method of reviewing goals and receiving feedback was the use of modern technology, with emails appearing to be the least preferred method (*“I’m not so sure about email... I normally read the first couple and then I just start to automatically delete them”*, F/HA), and a website, a smartphone app or text messages the most preferred: *“(The website/smartphone app) is definitely the most convenient... because there’s no face-to-face interaction”* (M/MA); *“You can reply to a text message at any time of day 24 hours a day...”* (M/HA). A perceived disadvantage of using self-monitoring to review goal attainment was the need for self-motivation and lack of receiving reassurance from an external source (*“You’d have to be really self-motivated to self-monitor and I know I’m not”*, F/MA), whereas potential costs, lack of time, potential for criticism and issues of recall were considered the main drawbacks of having goals reviewed by a health professional: *“... there’s something about getting the feedback in person that feels really uncomfortable... even if they did it really sympathetically and supportively...”* (M/HA); *“(the advice from a health professional) would depend on cost and that would be prohibitive for a lot of people in terms of having a professional review”* (F/MA). Time commitment and the need to ensure inclusivity (i.e. for those not owning a smartphone) were issues identified for modern technology applications: *“Some people don’t have the time to do apps and track everything they eat everyday”* (F/HA).

Many participants expressed the opinion that a combination of face-to-face meetings with a health professional (*“If you’ve got a meeting with someone, that’s going to be the most motivating way and then I think if you had a text message... that still helps”*, M/MA), or the ability to share experiences with others (*“Technology but with an element of being able to share that with others who were either trying to achieve the goals or share it with a health professional then that’s fine”*, F/HA), and

modern technology would be best when reviewing and receiving feedback on goal attainment. Participants largely preferred to receive reminders to review goals on a weekly basis, and then a more detailed goal review on a monthly basis. The need for flexibility was also expressed however, with some participants indicating that reviewing goals and receiving feedback should be tailored to people's needs: *"You need to be able to set that yourself... you'd have to have an option to say ok how often do you want a reminder? ... but be able to change it if you needed to"* (M/MA). When struggling to meet set MedDiet goals, participants expressed the need to receive positive messages and constructive reinforcement (*"It's trying to be positive and not negative. It's trying to find the positives of like "Yeah, alright, you might not have had a brilliant week but still you did this and you had this" ... otherwise people are going to think "oh what's the point" and just give up"*, M/HA) as well as reminders of goals that have already been met and tangible outcomes that can be achieved by adhering to the diet: *"It would be nice to say... because you've been eating your vegetables or whatever it may be, that means your chances of having a heart attack gets reduced by so much percent"* (M/MA). Many would welcome practical tips on how to get back on track with their goals. Being able to communicate with a health professional or people who are also attempting to follow a MedDiet, via a face-to-face or group meeting, a phone call, text, an online chat or discussion forum, was important for most participants when struggling to meet a specific goal:

*"If you have any specific queries it would be really handy to just be able to ask somebody. You could have a little online chat with somebody... you then might be able to explain why you have fallen off and what help you need to get back on again to send you in the right direction"* (M/MA).

Participants expressed the need for flexibility on how information should be delivered to them, but emphasised that they would need to be able to access support quickly: *"If you are struggling then you need to be able to access that support quite quickly... if you have to wait weeks and weeks you would probably just stop doing all of it"* (F/HA).

## **Expectations of a Website Promoting the MedDiet**

Several sub-themes emerged when participants were asked to reflect on their expectations of a website that would help them follow the MedDiet. These included recipes, interactive features, nutritional information, shopping tips and cost-saving information, linking the website to a smartphone app, visual stimuli and background information on the MedDiet, as well as clarity, ease of navigation, accessibility and quality of information. Several undesirable features, as well as facilitators and barriers to using a MedDiet website were also mentioned. Table 2 presents these key expected features of a website promoting the MedDiet and the quotes supporting these findings.

## **Additional Components of a Work-Place Intervention Promoting the MedDiet**

Some participants thought that it would be important for the whole work-place to engage in MedDiet promotion activities, through newsletters (*“There might be a Health at Work newsletter, a weekly newsletter with new recipes...”*, M/HA), competitions (*“... have a level of competition... “if that business has got more participating people than that one, they’re top of the leader board”... get your colleagues signed up and you can support each other...”*, F/MA) and team lunches (*“If everyone brings something different then people will try things that they wouldn’t necessarily buy otherwise...”*, F/MA) for social engagement, involvement of the work-place restaurants and work-place themed days (*“You can get the work place to do a Mediterranean themed day once a month... where they only did dishes from that website... it would show it was easy to do”*, M/MA), as well as cooking demonstrations and classes (*“Teaching people how to cook well on a budget... and then have lunch together and show how easy it is”*, F/MA). Many also perceived that work-place activities should be combined with a family-oriented intervention. In particular, they expressed the

opinion that a MedDiet website should have a child-friendly version where children could interact with their parents to learn about the diet and start eating more Mediterranean: “... *the bit about the website having a section for the children to sit possibly next to you on their tablet while you’re on the laptop so that they’re on the site with you... parallel interacting really*” (M/MA).

Table 3 summarises the key findings of this paper and the implications for the development of an internet-based, work-place MedDiet intervention.

## DISCUSSION

This qualitative study among adult employees in South West England showed that participants perceived that it would be challenging to adhere to some MedDiet recommendations. Participants largely emphasised the need for a tailored approach to setting specific MedDiet goals, as well as reviewing and receiving feedback on goal attainment. Several desirable features of a website promoting the MedDiet were reported, whereas social support and work-place activities were considered an important facilitator of MedDiet adoption. These issues are essential to inform interventions to promote the MedDiet in non-Mediterranean regions.

Participants largely considered that legumes, olive oil, fish, red meat and dairy products were the foods whose consumption they would find most challenging to change in order to adhere to the MedDiet. This finding confirms our earlier results, which showed that the majority of employees did not comply with the MedDiet recommendations for these foods.<sup>13</sup> This indicates that consumption of these particular foods should be addressed by a future intervention, in order to promote adherence to the MedDiet as a whole in this population. Perceived cost, lack of cooking skills, time, length of

preparation, taste and family preferences were the barriers mostly mentioned for not adhering to these recommendations. Perceived costs, time management, lack of time and family pressures were also identified as important barriers to MedDiet adherence among healthy older adults in East Midlands, England,<sup>20</sup> whereas perceived length of preparation and giving up favourite tastes were inversely associated with MedDiet adherence among healthy British adults of retirement age.<sup>21</sup> The need to incorporate social support to facilitate attempts to follow the MedDiet was also largely emphasised. This is in agreement with recent findings reporting that a supportive environment and family members are important perceived facilitators of MedDiet adherence<sup>20</sup> and the recommendation that engaging family members with intervention delivery and content is an important component of effective work-place interventions.<sup>22</sup>

Goal setting is a promising strategy to change dietary behaviours.<sup>23,24</sup> Our findings show that several goal-setting methods are perceived as feasible in helping participants to start adhering to the MedDiet. Self-selection of goals was deemed important by most, due to the perceived empowerment this action would give them. Many participants favoured the idea of setting goals with assistance from a nutrition expert, due to their expertise and the personal nature of this interaction. This is supported by earlier research reporting that health professionals are rated highly in terms of reliability and expertise regarding the provision of nutrition information.<sup>25</sup> Choosing from a list of pre-defined goals was preferred by some participants due to the perceived benefit of having an easily accessible reference to specific targets that need to be achieved. Allowing participants to choose the order by which they would tackle pre-defined MedDiet goals is suggested to facilitate dietary changes towards the MedDiet.<sup>26,27</sup> The need to set specific goals that would lead to communicated tangible outcomes was consistently emphasised. Setting specific and quantitative, but realistic, as opposed to generic goals, is suggested to facilitate dietary behaviour change.<sup>24</sup> Furthermore, family involvement in the goal-setting process was deemed largely important, indicating that a future

intervention should allow individuals the choice to engage their families with goal setting, in order to facilitate social support and food-related decision-making.

Overall, there was a preference for reviewing goals by using a combination of methods (smartphone app or website and assistance from a nutrition expert), and receiving feedback by a health professional with an option for feedback to be delivered via an app, website, text messages, or at a face-to-face session. Preferred frequency of goal reviewing and feedback delivery varied. This variety in participants' preferences regarding feedback delivery might stem from the wide age range of our sample, with younger employees likely to be more comfortable with using internet/smartphone technology compared to older employees, who might potentially prefer more traditional methods of contact. These results strengthen the notion that a tailored approach should be utilised not only for goal-setting, but also when reviewing and providing feedback on goal attainment. Providing tailored dietary and psychosocial feedback, based on set goals and established behaviour change theories, is suggested to enhance competencies, self-efficacy and motivation to change dietary behaviours.<sup>11,28,29</sup> Self-monitoring was perceived as the least judgemental method to review goals, as participants perceived that they would be more likely to convey their true dietary habits if they used an app or website to self-monitor. Notwithstanding the preferred method of goal reviewing and feedback delivery, self-monitoring is an important component of effective goal-setting strategies for dietary behaviour change<sup>11,24</sup> and successful work-place interventions,<sup>22</sup> and should be incorporated in a future intervention promoting the MedDiet. Engaging with an expert or individuals who are attempting to change the same behaviours was deemed an important factor to get back on track when struggling to meet MedDiet goals. Encouraging social support is an important component of effective dietary interventions<sup>11</sup> and our participants' suggestions should be considered when developing an internet-based MedDiet intervention.



Several desired features of a web-based MedDiet application were reported by participants. An earlier study evaluating a MedDiet website in Scotland showed that the recipes section, as well as interactive sections providing practical advice, were perceived as more helpful and were visited more regularly by participants, compared to sections providing theoretical information.<sup>30</sup> Increased interactivity is suggested to increase the effectiveness of health-related web-based applications<sup>31-33</sup> and thus, these insights should be considered when developing a website promoting the MedDiet.

Conducting qualitative formative research prior to intervention development is suggested to aid the development of acceptable and effective interventions.<sup>10</sup> We recruited both men and women to gain a wide range of insights on expectations of a MedDiet work-place intervention. This is a strength of our study because men are often under-represented in dietary research.<sup>26</sup> Even though we did not aim to conduct a formal comparison of opinions between genders, interrogation of the data did not reveal any such patterns. We also explored a range of relevant topics, including intervention content and behaviour change methods, thus ensuring the development of an acceptable intervention to promote dietary behaviour change.<sup>10</sup> Some limitations should be noted however, including the relatively small sample size and the inclusion of a self-selected sample of healthy employees with internet access. In addition, none of the participants in the focus groups had low adherence to the MedDiet and only 0.5% of the sample in our earlier work were low-adherers,<sup>13</sup> suggesting that the focus groups do not necessarily represent the views of those whom such an intervention should ideally target. Nevertheless, thematic data saturation was reached for this population of adult employees and earlier research has shown that internet-based nutrition applications are appreciated independent of an individual's level of computer literacy,<sup>12,34</sup> suggesting the potential acceptability of the internet in promoting the MedDiet among individuals of different characteristics.

## **IMPLICATIONS FOR RESEARCH AND PRACTICE**

Prior to the development of an intervention to promote the MedDiet to South West England, there is a need to investigate its transferability to this population, which has different cultural and dietary characteristics<sup>1,13</sup> and might not be used to or responsive to this diet due to barriers to consuming certain foods. Our study suggests that several barriers to adhering to the MedDiet should be addressed by a future intervention to promote this dietary pattern among adult employees residing in this non-Mediterranean region. Such an intervention should ideally utilise a tailored, participant-led approach to setting MedDiet goals and reviewing and receiving feedback on goal attainment, and develop social support mechanisms to facilitate dietary adherence. Several desirable and undesirable features of a web-based application to promote the MedDiet were identified as facilitators of its use and adherence to the diet. Results from this study can form the basis for the development of an internet-based, work-place intervention to promote the MedDiet in non-Mediterranean regions. Although this formative work specifically focuses on the MedDiet, some of the current qualitative findings provide useful insights to public health researchers and nutrition educators planning to develop initiatives to promote other healthy dietary patterns in the work-place, in addition to the MedDiet.

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**Table 1.** Demographic Characteristics of Participants (n and %) and Adherence to the Mediterranean Diet

	<b>Total (n = 29)</b>	<b>Women (n = 15)</b>	<b>Men (n = 14)</b>
Age, y <sup>a</sup>	42.6 (9.5)	43.3 (7.9)	41.8 (11.1)
Marital status			
Married/cohabiting	20 (68.9)	8 (53.3)	12 (85.7)
Single	9 (31.1)	7 (46.7)	2 (14.3)
Ethnic origin			
White	27 (93.1)	14 (93.3)	13 (92.9)
Other	2 (6.9)	1 (6.7)	1 (7.1)
MedDiet score <sup>a,b</sup>	33.6 (3.3)	33.7 (3.8)	33.4 (2.9)
MedDiet adherence			
Low (score=0-20)	0 (0.0)	0 (0.0)	0 (0.0)
Moderate (score=21-35)	21 (72.4)	10 (66.7)	11 (78.6)
High (score=36-55)	8 (27.6)	5 (33.3)	3 (21.4)

MedDiet, Mediterranean diet

<sup>a</sup> Mean and standard deviation

<sup>b</sup> Range of total MedDiet score=0-55

**Table 2.** Desired Features of an Internet-Based Application Promoting the Mediterranean Diet

Emerging themes	Representative quotations
<b>Recipes</b>	
Simple, quick, cost-effective recipes	“... I’d want as many recipes as possible...” (F/MA)
Recipes categorised by meal, degree of difficulty, cost per portion and preparation time	“... like a graded system... one star, two star, three star... these are ones that are easy and quick to make, these are more complicated or require more specialist ingredients... put a code next to them so you can look for what you want.” (M/MA)
Recipe search engine	“... have a very good search facility so that you would be able to say recipes with pulses and then you’d have that.” (M/MA)
Nutritional information of recipes	“... to have the calories (of the recipes)... it would save having to look elsewhere.” (F/HA)
Link between recipe use and an interactive dietary intake tracker or a shopping list	“... if you could pull (the nutrition information of recipes) into your tracker... then that would help you be able to tot up over the course of a week how you’ve done against the ideal and perhaps show you where your deficits might be.” (M/HA)
Ability to save favourite recipes	“... like a recipe book so you save it and you log in... so you don’t have to trawl back through to find a recipe.” (M/MA)
Ability to leave feedback and comments on recipes	“... an ability to feedback on recipes, or send in a recipe...” (F/MA)
<b>Interactive features</b>	
Secure personal tracker for goal reviewing	“... something where you could like input your current diet and then show how this compares to the MedDiet...” (F/MA)
Feedback on goal attainment, ways to improve and tangible outcomes of favourable dietary changes	“A tracker with a count down so as you’re adding stuff you’ve eaten it tells you, ‘you’ve got x number of this left to have during the week’ and suggest where you might have it... or it says ‘you’ve had too many of these’.” (M/MA)
Comparison of personal achievements with those of	“... you can, if you’ve got any competitive nature in yourself, become part of a group and then you can be compared with the



others	<i>rest of the group and that can incentivise you... like 'the foods you've eaten put you in the top 10% of this group'.</i> (F/MA)
Discussion forum	<i>"... have a message board so that we get a community built up and support each other."</i> (F/MA)
Live online chat with a health professional	<i>"Have the option of chat... then there's actually somebody sat in an office that replies instantly... over a video or typing or through sound... then you don't feel like you're on your own, there is somebody there if you need extra advice."</i> (F/MA)
Blogs	<i>'Blogs... to follow someone who does it for a long time or does it really good or someone who struggles with it...'</i> (M/HA)
Ability to set preferences for being contacted, receiving reminders/updates and goal reviewing	<i>"You could set how often you wanted to be contacted. Whether it's once a week or whether you get an email sent to you once a month with new recipes, so we're in control of how often you pester us... you could choose to turn off if you wanted to."</i> (F/HA)
Link between the website and social media	<i>"... a Twitter account that tweets you a recipe every day... why don't you buy this or try this, this week..."</i> (F/MA)
<b>Nutritional information</b>	
Explanation of the MedDiet and food amounts	<i>"A kind of outline of what the MedDiet basics are... what's the portion size? How much can you eat?"</i> (M/MA)
Nutritional benefits of foods	<i>"People need to know what the benefits are. So by doing this... you'll get less of this and more of that... something to say 'well done you've managed to change and therefore you've reduced your chances of heart disease by 3%'."</i> (M/MA)
Tangible health benefits of adherence	<i>"... food swaps... so kind of if you're eating this you can swap it with one thing to make it more Mediterranean..."</i> (F/MA)
Dietary adaptations and food swaps	<i>"... if you have some sort of allergy then you could say these (recipes) are good... you can put that information into tabs at the top of the web page..."</i> (F/MA)
Dietary adaptations to suit individual circumstances	
<b>Shopping tips and cost-saving information</b>	
Basic, commonly used, seasonal, cheap ingredients	<i>"It might be quite nice to have a store cupboard list... advising you on what to go out and buy when you first start... so you've</i>

	<i>got loads of stuff in your cupboard.” (F/MA)</i>
Information on preparation and cooking of unfamiliar ingredients	<i>“... some of the different Mediterranean vegetables that perhaps we are not so familiar with... try chopping it up and putting it in a salad or something like that would be quite good... to get you to try different stuff.” (F/MA)</i>
Link between the website and supermarket offers	<i>“... if (a store) has got a particularly good offer on, something that meets the criteria for the MedDiet... if that texted through to tell you then I would certainly go and probably take that offer up... it’s cost saving and it fulfils the MedDiet.” (M/MA)</i>
Discount food vouchers to facilitate adherence	<i>“Maybe you have a recipe of the week and there’s a discount voucher to get some ingredients for that cheaper...” (F/MA)</i>
<b>Linking the website to a smartphone app</b>	
Ability to browse website from a smartphone	<i>“... it’s got to be set up to work on a smartphone, absolutely essential...” (M/HA)</i>
Using the app to review and interactively receive feedback on goal attainment	<i>“It would be great if you could go ‘I’ve just had this for lunch’ and it throws it into your page and works it all out for you... get a message going ‘You’ve done really well, but why don’t you swap chicken to fish once a week see how that goes’.” (M/HA)</i>
Using the app to facilitate food shopping and recipe preparation	<i>“... (an app) that you could pull up when you’re at the supermarket and go ‘right, did I buy everything that I need’ and then it would go ‘ooh don’t forget you didn’t buy olive oil’ ... to kind of help you remember what you are doing.” (F/MA)</i>
<b>Visual stimuli/ background MedDiet information</b>	
Photographs with links to the recipes	<i>“I think it’s got to be very visual.” (M/MA)</i>
Cooking demonstration videos	<i>“... a You Tube type video of somebody demonstrating the cooking of the recipe, that would be really helpful.” (F/MA)</i>
Background and historical information on MedDiet foods, lifestyle and tradition	<i>“It would be good to see stories about... how (Mediterranean people) cook, the difference between the green and black olives these sorts of things. It keeps you entertained... but add it in as links... so that you can look stuff up if you want to.” (F/HA)</i>

### Technical characteristics and content quality

Simple, well-structured information	<i>“Well structured... a very clear sort of common icons and sort of side panels with very quick links...” (M/HA)</i>
High-quality information	<i>“It’s the quality of information that’s important. I’d much rather it was concise but with good quality information on.’ (F/MA)</i>
Website search engine	<i>“... a search engine... you want to find something and you want to find it quickly and accurately.” (M/MA)</i>

### Undesirable features, facilitators and barriers to using a website promoting the MedDiet

Supportive character and motivational messages	<i>“It’s that preachiness... it needs to be very carefully worded so it feels like it’s supporting you...” (F/MA)</i>
Amount of nutritional information	<i>“... too much about calories and fat and all, I’d feel a bit like I was being kind of judged... if it was more a focus of ‘you know you’ll really enjoy eating this because it’s going to taste delicious - oh by the way it’s also quite healthy’...” (F/MA)</i>
Non-compulsory sign-up	<i>“For users who want to try a couple of recipes, don’t try to make them sign up just yet and let that be their choice...” (M/MA)</i>
Advertising	<i>“... not going down the line of getting sponsorship from someone pushing their product.’ (M/HA)</i>
Regular updates on all website sections	<i>“... if things are being updated, that makes you want to go back to make sure you’ve not missed on new information.” (M/MA)</i>
Facility for user feedback	<i>“...just get feedback from the users rather than risk it going stale.” (M/MA)</i>
Extensive promotion	<i>“There would have to be a public promotion of it as well to get people interested and curious.” (F/MA)</i>
Easy to remember name	<i>“The name – if it had a really catchy name then I’d probably remember it and I wouldn’t need to create a favourites.” (M/MA)</i>
Navigation	<i>“... the websites I go into haven’t got too many layers of information in them and are easy to navigate around...” (M/MA)</i>

**Table 3.** Implications of Findings for the Development of an Internet-Based Nutrition Intervention to Promote the Mediterranean Diet in Work-Place Settings in non-Mediterranean regions

Key components to be addressed	Desired outcome	Potential intervention content to achieve outcome
<p><b>in a web-based, work-place MedDiet intervention</b></p>		
<p>Promoting adherence to the MedDiet</p>	<p>Improving adherence to the MedDiet as a whole and to the MedDiet recommendations for specific foods in particular</p>	<p>Adopting a tailored, participant-led approach to change</p>
	<p>Overcoming barriers to adopting the MedDiet</p>	<p>Providing cost-effective shopping tips, information on seasonal, low-cost ingredients, cooking demonstrations, simple, quick-to-make recipes, time- saving ideas, ideas on how to improve flavours in meals, ideas on how to prepare unfamiliar foods</p>
	<p>Increasing social support from participants’ families and social environment</p>	<p>Developing study-related newsletters aimed at employees’ families; inviting employees’ family members to study-related work-place events and activities; web-based application to incorporate a section for the whole family, including spouses and children</p>

Facilitating goal setting	Understanding preferred method to set goals to adopt the MedDiet	Keeping a flexible, tailored approach to goal setting, or utilising a combination of goal setting methods, based on individual needs and competencies; involving family members in goal setting
Facilitating goal reviewing and receiving feedback on goal achievement	Understanding preferred method and frequency of reviewing MedDiet goals and receiving feedback on goal achievement	Reviewing goals via a combination of smartphone app/ website and personal counselling; receiving feedback on goal achievement from a health professional/ nutrition expert via a smartphone app/website/text messages or via face-to-face counselling; keeping a flexible, tailored approach to method and frequency of goal reviewing and feedback delivery, based on individual needs, competencies and preferences, and based on established theories of behaviour change; encouraging self-monitoring
	Understanding preferred method and frequency of receiving feedback when struggling to meet goals	Reminding of the benefits and tangible outcomes of MedDiet adherence; reinforcing achieved changes; providing encouragement and positive messages; creating opportunities for social support
Other desirable components of a work-place intervention promoting the MedDiet	Identifying other components of a work-place intervention to promote the MedDiet	Work-place newsletters with MedDiet information linking to the website; themed days and team lunches; competitions; involvement of work-place canteens/restaurants; work-place cooking classes and demonstrations