

1 **Interpretations of healthy eating after a diagnosis of multiple sclerosis: A secondary**  
2 **qualitative analysis**

3 Hannah Weiss<sup>1</sup>, Rebecca D. Russell<sup>1</sup>, Lucinda J. Black<sup>1,2</sup> and Andrea Begley<sup>1\*</sup>

4 <sup>1</sup>Curtin School of Population Health, Faculty of Health Sciences, Curtin University, Western  
5 Australia.

6 <sup>2</sup>Curtin Health Innovation Research Institute, Curtin University, Western Australia.

7 hannah.weiss@postgrad.curtin.edu.au,

8 rebecca.d.robinson@postgrad.curtin.edu.au,

9 lucinda.black@curtin.edu.au,

10 a.begley@curtin.edu.au

11 \*Correspondence should be addressed to: a.begley@curtin.edu.au Tel.: +61 89266 2773

12

13 **Abstract**

14 **Purpose:** Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous  
15 system that causes debilitating symptoms. Currently, there is insufficient evidence to  
16 recommend a special diet for people with MS to slow disease progression and reduce  
17 symptoms. Little is known about the dietary choices made by people with MS. This study  
18 aimed to explore the interpretations of healthy eating in people recently diagnosed with MS.  
19 Objectives were to investigate the types of changes in food choices and to describe the impact  
20 of making these changes.

21 **Design/methodology:** A social constructionist approach applying qualitative secondary  
22 analysis of semi-structured interviews was conducted ( $n=11$ ). Interviews were transcribed,  
23 coded, and analysed using a deductive approach.

24 **Findings:** Participants were mostly female (82%), mean age 47 years and mean time since  
25 diagnosis eight months. Four themes emerged from the data: (1) moving in the direction of the  
26 dietary guidelines, (2) modifying intake of dietary fat, (3) requiring mental effort, and (4)  
27 needing input from a dietitian.

28 **Originality:** How people interpret healthy eating advice and the impact on making food choice  
29 changes is useful for explaining dietary changes in MS. Special diets promoted for MS provide  
30 conflicting advice, and the lack of access to dietitians means that additional mental effort is  
31 required when interpreting healthy eating messages and diets.

32 **Practical implications:** The directions of food choices and the absence of dietetic input  
33 highlighted in this study suggest the need for evidence-based nutrition education that enables  
34 people with MS to tailor dietary guidelines according to their preferences.

35 **Keywords:** food; diet; multiple sclerosis; nutrition; qualitative

36

## 37 **Introduction**

38 Multiple sclerosis (MS) is a chronic inflammatory immune-mediated condition characterised  
39 by the accumulation of lesions in the central nervous system. People with MS (PwMS)  
40 experience a wide range of symptoms, including cognitive decline, fatigue, muscle weakness  
41 leading to mobility issues and speech and vision impairments (Thompson et al., 2018). MS  
42 affects more women than men and is estimated to affect more than two million people  
43 worldwide; the most frequent age of onset is between 20 and 40 years (Reich et al., 2018).  
44 Lifestyle recommendations for PwMS include healthy eating (Jakimovski et al., 2019; MS  
45 Research Australia, 2020b), which can be achieved by consuming a wide range of nutritious  
46 foods and limiting intake of foods high in saturated fats, added sugars, and added salt, i.e.,  
47 following the national dietary guidelines of the country of residence (National Health and  
48 Medical Research Council [NHMRC], 2013; Public Health England, 2016; United States  
49 Department of Health and Human Services & Agriculture., 2020). As a result of healthy eating  
50 advice, many PwMS focus on altering their food choices after diagnosis as a way of managing  
51 their symptoms (Brenton et al., 2019; Russell, Black, et al., 2018). The majority of PwMS are  
52 interested in modifying their diet (Brenton & Goldman, 2016), and approximately 40% change  
53 their diet after diagnosis (Fitzgerald et al., 2018b; Marck et al., 2021; Russell, Lucas, et al.,  
54 2018).

55 While the research on diet and MS is growing, there is still insufficient evidence to support any  
56 therapeutic or specific dietary patterns to reduce disease severity and slow disease progression.  
57 Hence, the healthy eating advice provided by MS organisations and expert committees for  
58 PwMS is to optimise their nutritional status according to national dietary guidelines (MS  
59 Research Australia, 2020a; Tredinnick & Probst, 2020). In interviews with PwMS, previous  
60 qualitative research found that participants described their perceived incompatibility between  
61 the lack of healthy eating advice and the seriousness of the disease (Russell, Black, et al., 2018).  
62 PwMS were interested in making dietary choices, but they found it difficult to judge the  
63 credibility of information, particularly online information. Other studies have found that PwMS  
64 were highly motivated to make dietary changes but were confused about where to seek dietary

65 advice and were sceptical of national dietary guidelines (Russell et al., 2021). The lack of  
66 tailored and personalised dietary advice makes PwMS vulnerable to making food choices that  
67 may negatively affect their nutritional status, resulting in nutrient deficiencies (Masullo et al.,  
68 2015). Therefore, learning how people with a disease diagnosis think, feel, and act in relation  
69 to food choices in the context of national dietary guidelines would inform behaviour change  
70 theory development and education directions.

71 Nutrition as a discipline is rife with conflicting and/or misinformation. For multiple sclerosis,  
72 there are a variety of non-evidence-based, special, or alternative diets marketed to reduce the  
73 severity of symptoms, but they provide conflicting interpretations of the national dietary  
74 guidelines. Such diets include the *Swank Diet* (a diet which restricts fat intake to < 20 g/day;  
75 (Swank, 1970)), the *Overcoming MS* diet (a plant-based, wholefood diet that includes seafood  
76 and avoids saturated or altered fats; (Jelinek, 2010)) and the *Wahls Protocol* (a version of the  
77 Palaeolithic or 'paleo' diet that excludes dairy, grains, legumes, and eggs, and emphasises  
78 vegetables and meats; (Wahls & Anderson, 2014)). There is a plethora of conflicting dietary  
79 information available on the Internet and much of this derived from individual experiences  
80 (Beckett et al., 2019). There is also higher usage of complementary and alternative medicines  
81 in PwMS (Leong et al., 2009). These include vitamin supplements (usage reported by 82% of  
82 PwMS), essential fatty acid supplements (81%), and mineral supplements (63%) (Leong et al.,  
83 2009).

84 Qualitative methodological approaches contribute to improving evidence-based practices and  
85 have advantages over quantitative research or can explain the results of qualitative findings  
86 (Williams et al., 2020). These approaches provide rich information as they allow for in-depth  
87 exploratory discussions on how people interpret a variety of phenomena, such as healthy eating  
88 advice (Bisogni et al., 2012). In addition, qualitative methods can contribute to explaining ideas  
89 and concepts related to thoughts, feelings, and actions related to food and eating. Practitioners  
90 can benefit from insights into how people interpret healthy eating advice and the effort required  
91 to achieve healthy eating, such as information processing decisions made by people with

92 diseases and the associated mental effort or cognitive load (Brassard & Balodis, 2021). There  
93 are very few qualitative studies with people with MS.

94 Qualitative secondary analysis (QSA) of pre-existing data can explore new research questions  
95 using different approaches that provide additional knowledge for evidence-based practice.  
96 QSA is recognised as a way to maximise the application of collected data from an exploratory  
97 viewpoint without further burdening participants (Ruggiano & Perry, 2019; Sherif, 2018). This  
98 secondary analysis aimed to explore the interpretations of healthy eating in people recently  
99 diagnosed with MS. The objectives were to 1) investigate the types of changes in food choices  
100 and 2) describe the impact of making these changes.

## 101 **Methods**

102 This study was conducted and reported in compliance with the Consolidated Criteria for  
103 Reporting Qualitative Research guidelines (Tong et al., 2007).

### 104 **Study design**

105 The primary analysis explored the perceived role of diet in response to a recent MS diagnosis  
106 using a grounded theory approach, due to the lack of qualitative research in this population  
107 group (*Reference moved for peer review*). During the interviews, participants provided detailed  
108 descriptions of their changes in food choices; however, these discussions did not emerge as the  
109 focus for the analysis. The rich descriptions provided by the participants generated new  
110 questions about the interpretation and impact of healthy eating advice on food choices, enabling  
111 us to apply QSA to the interviews to generate additional perspectives. QSA was conducted  
112 using a social constructionist lens as this perspective views people as constructing, forming  
113 and negotiating understandings of food, eating and health by interacting with others and the  
114 environment and through their own personal experiences (Bisogni et al., 2012; Swift &  
115 Tischler, 2010).

116 **Participants and recruitment**

117 Participants were recruited for the primary study in 2017 using purposive sampling. Potential  
118 participants were contacted through a local, not-for-profit MS organisation, MS Western  
119 Australia (MSWA), which had approximately 2,400 members at the time of the research  
120 (General Manager Member Services, Personal Communication). We estimated that between  
121 10 to 15 interviews would be sufficient to achieve data saturation based on established  
122 purposive sampling methods (Hennink & Kaiser, 2022). Eligible participants were aged 18  
123 years or older, had been diagnosed with MS in the previous 15 months, spoke English as a  
124 primary language, lived in Western Australia, and were not pregnant. MSWA contacted  
125 eligible participants via email, briefly outlining the purpose of the research and providing the  
126 contact details of the researchers. Interested PwMS were then provided with more details about  
127 the study and given the opportunity to ask further questions by phone or email. A second  
128 recruitment email was sent to increase the numbers of participants. Participants were offered a  
129 department store voucher (AU\$20) as compensation for their time. Participants were informed  
130 of the study's aim but were not given detailed information about the specific objectives of the  
131 research. Written informed consent was obtained and numbers were assigned for anonymity.  
132 The study was approved by the Human Research Ethics Committee of *Blank* University  
133 (HRE2017-0395).

134 **Data collection**

135 Individual in-depth interviews were conducted with participants to explore their diet-related  
136 responses to their MS diagnosis. The original research team (two nutritionists and two  
137 dietitians) created an interview guide (see Table 1) based on relevant literature, which has been  
138 described elsewhere (*reference removed for peer review*). This interview guide was piloted  
139 with two PwMS to assess the interview duration and feasibility of the questions. The interview  
140 guide and interview techniques were revised by an experienced qualitative researcher (Author  
141 4) before the subsequent interviews.

142 [Insert Table 1]

143 All interviews were conducted in 2017 by Author 2 in a private meeting room at MSWA  
144 facilities or online using Skype (version 7.58, Microsoft Corp., Luxembourg). Where required,  
145 probing was used to elicit more information from participants during the interview. All  
146 interviews were recorded and transcribed within 24 hours of interview completion. Transcripts  
147 were posted to participants to ensure that their data were accurately transcribed and reflected  
148 their views. Recruitment, data collection and analysis continued until there were no new ideas  
149 and data saturation was reached (Saunders et al., 2018). Data saturation is reached when there  
150 is enough information to replicate the study and when the ability to obtain additional new  
151 information has been exhausted.

## 152 **Data analysis**

153 The QSA used a general deductive approach with thematic analysis and was completed after  
154 the findings of the primary study were published (*reference removed for peer review*). The  
155 original versions of the transcripts were uploaded into NVivo software (version 12.6.0, QSR  
156 International Pty Ltd, Australia). Before the data analysis commenced, the research team  
157 developed a priori codes guided by the research objectives for the QSA. The initial codes were  
158 food and food groups, meal timings, supplements, information sources and behavioural  
159 choices. Author 1 performed all coding using clean, uncoded transcripts and audio recordings.  
160 As Author 1 was not involved in the primary data analysis, QSA ensured the independent  
161 reading of transcripts (Sherif, 2018). Transcripts were analysed line-by-line to identify text that  
162 aligned with the a priori codes. Emergent codes were generated to capture references to food  
163 choices. The codes were reviewed for relevance to the research objectives and grouped into  
164 higher categories to produce the themes. All categories and associated codes were mind  
165 mapped. The mind map created an audit trail and facilitated in-depth discussion of the findings  
166 with the research team. Peer debriefing with an experienced qualitative researcher (Author 4)  
167 was used to corroborate the emerging themes. Author 1 discussed these themes with other  
168 research team members (Authors 2, 3 and 4) before further refinement. The research team  
169 verified the final codes, categories and themes using their nutrition and dietetics professional  
170 expertise and extensive familiarity with the context of the primary research. Quotes were

171 provided to confirm the participants' perspectives. This iterative analysis process embraces  
172 subjectivity and recognises that different people will have different experiences with the same  
173 diagnosis, allowing for rich findings to be extracted from the data (Swift & Tischler, 2010).

## 174 **Results**

### 175 **Participant characteristics**

176 Eleven PwMS (two men, nine women) participated in this study. Participants had a mean  
177 (standard deviation, SD) age of 47 (13) years (range 31–70 years) and mean (SD) time since  
178 diagnosis was 8 (5) months (range 3–15 months). See Table 2 for self-reported participant  
179 characteristics. The interview duration ranged from 32 to 75 minutes, with a mean (SD)  
180 interview duration of 54 (14) minutes.

181 [Insert Table 2]

### 182 **Themes**

183 Four themes emerged from the data: (1) moving in the direction of dietary guidelines, (2)  
184 modifying intake of dietary fat, (3) requiring mental effort, and (4) needing input from a  
185 dietitian.

#### 186 *Theme 1: Moving in the direction of dietary guidelines*

187 Participants described changing their focus on eating more fruits and vegetables since being  
188 diagnosed with MS. Messaging about ensuring variety and colour with fruit and vegetable  
189 intake resonated with participants.

190 *I think it's just making sure I get that variety [be]cause I know I'll regret it if I don't continue*  
191 *eating vegetables and things—Participant 6, female, 49 years old, 12 months since diagnosis*

192 *Variation, I'm going to say, is the key to keeping it interesting with veggie stuff because*  
193 *otherwise, it can get quite boring—Participant 10, female, 31 years old, 4 months since diagnosis*



194 For some participants, this was related to the specific diet they were followed. For example,  
195 the *Wahls Protocol* (a modified Palaeolithic diet for MS) emphasises the daily consumption of  
196 nine cups of fruits and vegetables.

197 *I'm eating six cups [of vegetables] minimum a day—Participant 7, female, 39 years old, 14*  
198 *months since diagnosis*

199 *Well, to me, it's [a healthy diet for PwMS] plenty of fruit and vegetables— Participant 2,*  
200 *female, 70 years old, 4 months since diagnosis*

201 Participants also discussed that they had started to reduce or avoid discretionary foods, such as  
202 foods with refined sugars and alcohol.

203 *Balance— some meat, fruit and veg., grains [and] limiting chocolate, sweets, sugar intake,*  
204 *and alcohol intake—Participant 9, male, 46 years old, 9 months since diagnosis*

205 *Cutting down on things like alcohol are probably a good thing—Participant 10, female, 31 years*  
206 *old, 4 months since diagnosis*

## 207 *Theme 2: Modifying intake of dietary fat*

208 Much of the discussion described modifying dietary fat intake by increasing intake of the intake  
209 of unsaturated fats and decreasing the intake of saturated fats. Participants often referred to  
210 unsaturated fats as 'good fats' (*Participant 5, female, 54 years old, 12 months since diagnosis*) and  
211 were increased by consuming more fish and supplementing their diet with flaxseed oil.  
212 Participants discussed replacing 'land animals' (*Participant 9, male, 46 years old, 9 months*  
213 *since diagnosis*) with fish, and avoiding dairy products to decrease saturated fat intake.  
214 Avoidance of dairy foods was frequently mentioned by participants and is recommended by  
215 both the *Overcoming MS* diet and the *Wahls Protocol* diet, as both diets strongly discourage  
216 dairy intake and promote the intake of seafood, nuts, seeds, and plant oils.

217 *I've cut out a lot of saturated fat, so I don't eat land animals anymore; I just eat fish—*  
218 *Participant 9, male, 46 years old, 9 months since diagnosis*

219 *I have a couple of tablespoons of that [flaxseed oil] every day, so I just hope, really, that*  
220 *what I'm doing is, is a step in the right direction—Participant 11, female, 49 years old, 9 months*  
221 *since diagnosis*

222 *I haven't eaten any gluten or dairy at all since I started the diet—it's non-negotiable; just*  
223 *don't do it—Participant 3, female, 38 years old, 4 months since diagnosis*

### 224 *Theme 3: Requiring mental effort*

225 The interview discussions pointed to the mental effort expended in the decision-making process  
226 for food choices. The need for conscious effort was influenced by several factors. First,  
227 adherence to specific diets was described as difficult, with inflexible dietary restrictions.

228 *There is no convenience with this diet; that's why, I mean, you've got to be prepared—*  
229 *Participant 3, female, 38 years old, 4 months since diagnosis*

230 Second, participants talked about the need to plan and prepare meals in advance to ensure they  
231 could always adhere to new food choices and/or special diets.

232 *Just get it [healthy food] organised that way: organise it upfront and in advance and plan*  
233 *ahead a bit, and that's something I've done more so in the last two years ... done more*  
234 *planning rather than totally ad hoc—Participant 6, female, 49 years old, 12 months since diagnosis*

235 *It's paleo to the extreme [Wahl's protocol]; it's got three types, there's sort of the beginners,*  
236 *then the intermediate, then the extreme. I'm halfway between the intermediate and the*  
237 *extreme [be]cause the extra one is—it's insane. I can't live like that; it's just too much—*  
238 *Participant 7, female, 39 years old, 14 months since diagnosis*

### 239 *Theme 4: Needing input from a dietitian*

240 None of the participants described seeking dietary advice from a dietitian before changing their  
241 food choices. Despite this lack of professional advice, participants explained substantial dietary  
242 changes, including the elimination of entire food groups. Neurologists were the most  
243 mentioned health professionals who gave dietary advice; however, all participants described

244 that there was little detail in the dietary discussion at the time of diagnosis. Participants  
245 mentioned other health care professionals when discussing dietary advice, including general  
246 practitioners (who gave balanced diet messages), doctors promoting MS special diets on the  
247 Internet, a naturopath, a counsellor, a Chinese medicine practitioner and a chiropractor.

248 *I spoke to a naturopath, who was very like, yes, vegetarian, cut out the dairy—all like hippy*  
249 *and excited about what I was doing, so I was like—I feel like I’m doing the right thing—*  
250 *Participant 10, female, 31 years old, 4 months since diagnosis*

251 *[Neurologist—name removed] has spoken about it [diet]; he’s my neurologist—Participant 4,*  
252 *female, 41 years old, 4 months since diagnosis*

253 Two medical doctors with MS (Dr. Terry Wahls and Professor George Jelinek) have produced  
254 commercial materials, and these were the diets most mentioned by participants. Their special  
255 diet messages were perceived as reliable because of their qualifications as physicians and their  
256 personal and lived experiences with MS.

257 *My counsellor actually recently recommended—or it just came up in conversation—about a*  
258 *Professor Jelinek. I don’t know if you’ve heard about him—he was diagnosed with MS, and*  
259 *he’s actually cured himself from it, so I thought—that’s interesting—Participant 11, female, 49*  
260 *years old, 9 months since diagnosis*

261 Even though no participants sought advice from a dietitian, when probed about speaking to a  
262 dietitian, half said that they would be interested if the dietitian specialised in MS. In response  
263 to a probe regarding the usefulness of being able to access a dietitian at MSWA, the response  
264 from *Participant 7 (female, 39 years old, 14 months since diagnosis)* was ‘100%, yep  
265 *definitely*’.

## 266 **Discussion**

267 Our study explored the way in which PwMS interpret healthy eating advice from national  
268 dietary guidelines, as promoted by MS organisations and expert committees, and the impact of

269 changes when diagnosed with the disease. We found that changes in food choices, such as  
270 increasing fruits and vegetables and modifying sources of dietary fat, were common among  
271 PwMS, and these choices occurred without dietetic input. Notably, the uptake and maintenance  
272 of dietary changes increased the cognitive load, and participants described the elevated levels  
273 of mental effort required to make these changes.

274 The recommended diet for PwMS is a healthy diet, following the national dietary guidelines  
275 (Altowaijri et al., 2017; MS Research Australia, 2020b). The participants in our study increased  
276 their consumption of fruits and vegetables and discussed the concept of variety. They also  
277 described decreasing their consumption of discretionary foods, suggesting that their food  
278 choices moved in line with national dietary guidelines, in this case, the Australian Dietary  
279 Guidelines (National Health and Medical Research Council [NHMRC], 2013). These were  
280 positive choices, and contrasted with those of the general Australian population, which  
281 typically has a more energy-dense diet with low consumption of fruits and vegetables (Grech  
282 et al., 2017; Ridoutt et al., 2016). In Western Australia, increasing fruit and vegetable intake  
283 has been promoted in population-wide social marketing campaigns, including the  
284 internationally recognised *Go for 2&5*<sup>®</sup> campaign (Pollard et al., 2008). Our findings are  
285 consistent with the MS literature, increasing consumption of fruits and vegetables was the most  
286 common dietary change described by Australians after a diagnosis of MS (Marck et al., 2021;  
287 Russell, Black, et al., 2018). Increased fruits and vegetable consumption have been associated  
288 with positive expectancies about improved mood and brain health in general populations  
289 (Smith et al., 2022). Statistically significant associations between healthy dietary habits and  
290 better quality of life have been reported for PwMS, including improved physical and mental  
291 health, indicating the beneficial effects of these dietary choices (Bromley et al., 2019; Evers et  
292 al., 2021; Fitzgerald et al., 2018a).

293 Modifying dietary fat intake was a common interpretation of healthy eating among the  
294 participants. There was a different emphasis on the need to reduce or avoid the pro-  
295 inflammatory response of certain foods and food groups containing dietary fat, leading

296 participants to remove entire food groups. Research in Australia has found that meat and dairy  
297 are the two most common food groups not consumed by PwMS (Marck et al., 2021). There  
298 was influence on meat and dairy choices or avoidance from advice from either the *Overcoming*  
299 *MS* diet or the *Wahl's Protocol* (Jelinek, 2010; Wahls & Anderson, 2014). The popularity of  
300 these special diets can also be attributed to the participants deeming this advice trustworthy,  
301 given that both authors are physicians with MS, however, the advice does not fit with the  
302 consensus to consume foods in line with national dietary guidelines (Russell, Black, et al.,  
303 2018). Nevertheless, while various restrictive diets marketed to pwMS may not fit within  
304 national dietary guidelines in relation to macronutrient intakes, a study comparing the impact  
305 of the Swank and Wahls elimination dietary interventions in PwMS showed that both diets  
306 were associated with better micronutrient intakes than a typical diet if they included the  
307 recommended supplements (Titcomb et al., 2021). Furthermore, both diets were also associated  
308 with reductions in fatigue and improvements in quality of life, likely due to the high intakes of  
309 fruits, vegetables and unsaturated fats, and limited intake of ultra-processed foods (Wahls et  
310 al., 2021).

311 The increased mental effort or cognitive load associated with a disease diagnosis and  
312 interpretation of healthy eating advice is not well documented in the MS population but is  
313 recognised in other populations (Byrd-Bredbenner & Eck, 2020). The effort and difficulty that  
314 the participants described adhering to special diets, such as the *Wahls Protocol* or the  
315 *Overcoming MS* diet were not surprising, given the rigid rules associated with these diets.  
316 Participants mentioned that new and increased planning and preparation were required to  
317 follow these diets or make other food choice changes. It has been described in other qualitative  
318 studies that the range of healthy eating advice for PwMS, and the conflicting nature of the  
319 advice, can lead to extensive time searching for information (Russell et al., 2021). PwMS are  
320 juggling everyday demands of life, such as continuing in employment; furthermore, a  
321 substantial proportion of PwMS are women of childbearing age who may have additional  
322 household responsibilities, including feeding families (Le Moal et al., 2021). These challenges  
323 of everyday demands of life and the mental effort required to interpret healthy eating

324 recommendations are likely to add to the pre-existing mental effort or cognitive load of people  
325 recently diagnosed with MS. However, the overall burden on PwMS to achieve healthy eating  
326 while coping with a condition that has recognised executive function cognitive symptoms, such  
327 as fatigue and brain fog, is largely unexplored in the literature (Grech et al., 2016).

328 Healthy eating advice tailored to PwMS would provide psychological and physical health  
329 benefits. There is scope to provide healthy eating advice that aligns with life goals and  
330 aspirations. A qualitative study of health behaviours in PwMS identified a sense of duty and  
331 self-identity as motivators for behaviour change. Participants discussed how they felt obliged  
332 to engage in healthy behaviours to preserve their quality of life and avoid being a burden on  
333 others (Plow & Golding, 2016). A recent population-based study analysed psychological  
334 factors associated with using different diets. The study showed that the Palaeolithic diet, which  
335 is similar to the *Wahls Protocol* diet, had the least harmful psychological effect, compared to  
336 gluten-free, weight-loss or vegan diets (Norwood et al., 2019). Moreover, participants  
337 following a Palaeolithic diet showed more characteristics of psychological strength, including  
338 health-motivated eating behaviours, higher self-control and less negative affect and depression,  
339 than participants following other dietary patterns. More research on the psychological impact  
340 of tailoring or personalising healthy eating advice to achieve national dietary guidelines is  
341 required for PwMS.

342 Our participants reported that they had sought healthy eating advice from a range of non-  
343 nutrition professionals, but it is unclear whether this advice was evidence-based. Dietitians  
344 have been recognised as key healthcare professionals in the care of PwMS (Soelberg Sorensen  
345 et al., 2019), but the participants did not seek personalised healthy eating advice from dietitians.  
346 Given the dietary choices described by our participants, such as removing entire food groups,  
347 the lack of dietetic input was concerning. At the time of the interviews, MSWA did not employ  
348 any dietitians; hence, the participants may have perceived a lack of access to dietitians  
349 experienced with MS. A needs analysis of PwMS in Australia found that approximately one-  
350 third of PwMS required access to a dietitian (McCabe et al., 2012); however, none of the PwMS

351 surveyed felt that these needs were adequately met. Limited access to a dietitian may explain  
352 why PwMS seek dietary advice from other healthcare professionals or make food choices that  
353 are not in line with dietary guidelines. There is a need for broader access to dietetic services  
354 and other programs, such as free nutrition education programs, to assist people recently  
355 diagnosed with MS to make healthy dietary choices. Supporting food literacy skill development  
356 by assisting PwMS in planning, selecting, and preparing healthy foods is also warranted.

357 Several techniques used in this study to ensure rigour, including the involvement of the same  
358 research team from the primary analysis (Amin et al., 2020; Williams et al., 2020); however,  
359 there are limitations to this study. In relation to confirmability, the sample size provided data  
360 saturation for the primary analysis, and we are confident that we achieved information power  
361 for the QSA (K. Malterud et al., 2016; Kirsti Malterud et al., 2016), we did not conduct further  
362 interviews. Transferability considerations included all participants were members of MSWA  
363 and from the same state in Australia. The selected participants may not have reflected the wider  
364 community of PwMS because they contacted the researchers to express their interest in the  
365 study; thus, there was potential for self-selection bias, where people with a specific interest in  
366 diet may have been more likely to participate. As this was a secondary analysis, the first author  
367 could not consider non-verbal cues from participants. The researcher who conducted the  
368 interviews (Author 2) took detailed notes after each interview and briefed Author 1 during the  
369 data analysis stage. Finally, the results are not generalisable to wider populations, given the  
370 nature of qualitative research; however, these findings are useful to inform future research in  
371 wider populations and add value to this field of research by providing a rich understanding  
372 about the decisions and challenges that people with MS have with regards to making healthy  
373 food choices.

374 The findings of this study increase our understanding of interpretation of healthy eating advice  
375 among people recently diagnosed with MS. The absence of advice from dietitians, coupled  
376 with the factors driving dietary choices made after diagnosis, highlights the need for improved  
377 access to and/or greater advocacy on the role of dietitians for PwMS, and dietary resources that

378 support behaviour change, such as nutrition education programs for PwMS. Such programs  
379 could tailor dietary guidelines to the physical and psychological needs of individuals after the  
380 diagnosis of MS. Further studies on dietary choices after diagnosis that include participants  
381 from diverse cultures and social contexts would provide a deeper understanding of this topic.

382



383 **References**

- 384 Altowaijri, G., Fryman, A., & Yadav, V. (2017). Dietary interventions and multiple sclerosis. *Current*  
385 *Neurology and Neuroscience Reports*, 17(3), 28-28. [https://doi.org/10.1007/s11910-017-](https://doi.org/10.1007/s11910-017-0732-3)  
386 [0732-3](https://doi.org/10.1007/s11910-017-0732-3)  
387
- 388 Amin, M. E. K., Nørgaard, L. S., Cavaco, A. M., Witry, M. J., Hillman, L., Cernasev, A., & Desselle,  
389 S. P. (2020). Establishing trustworthiness and authenticity in qualitative pharmacy research.  
390 *Research in Social and Administrative Pharmacy*, 16(10), 1472-1482.  
391 <https://doi.org/10.1016/j.sapharm.2020.02.005>  
392
- 393 Beckett, J. M., Bird, M.-L., Pittaway, J. K., & Ahuja, K. D. (2019). Diet and multiple sclerosis:  
394 scoping review of web-based recommendations. *Interact J Med Res*, 8(1), e10050-e10050.  
395 <https://doi.org/10.2196/10050>  
396
- 397 Bisogni, C. A., Jastran, M., Seligson, M., & Thompson, A. (2012). How people interpret healthy  
398 eating: contributions of qualitative research. *Journal of nutrition education and behavior*,  
399 44(4), 282. <https://doi.org/10.1016/j.jneb.2011.11.009>  
400
- 401 Brassard, S. L., & Balodis, I. M. (2021). A review of effort-based decision-making in eating and  
402 weight disorders. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 110,  
403 110333-110333. <https://doi.org/10.1016/j.pnpbp.2021.110333>  
404
- 405 Brenton, J. N., Banwell, B., Bergqvist, A. G. C., Lehner-Gulotta, D., Gampper, L., Leytham, E.,  
406 Coleman, R., & Goldman, M. D. (2019). Pilot study of a ketogenic diet in relapsing-remitting  
407 MS. *Neurol Neuroimmunol Neuroinflamm*, 6(4), e565.  
408 <https://doi.org/10.1212/nxi.0000000000000565>  
409
- 410 Brenton, J. N., & Goldman, M. D. (2016). A study of dietary modification: Perceptions and attitudes  
411 of patients with multiple sclerosis. *Multiple Sclerosis and Related Disorders*, 8, 54-57.  
412 <https://doi.org/10.1016/j.msard.2016.04.009>  
413
- 414 Bromley, L., Horvath, P. J., Bennett, S. E., Weinstock-Guttman, B., & Ray, A. D. (2019). Impact of  
415 nutritional intake on function in people with mild-to-moderate multiple sclerosis.  
416 *International Journal of MS Care*, 21(1), 1-9. <https://doi.org/10.7224/1537-2073.2017-039>  
417
- 418 Byrd-Bredbenner, C., & Eck, K. M. (2020). Relationships among executive function, cognitive load,  
419 and weight-related behaviors in university students. *American Journal of Health Behavior*,  
420 44(5), 691-703. <https://doi.org/10.5993/AJHB.44.5.12>  
421
- 422 Evers, I., Heerings, M., de Roos, N. M., Jongen, P. J., & Visser, L. H. (2021). Adherence to dietary  
423 guidelines is associated with better physical and mental quality of life: results from a cross-

424 sectional survey among 728 Dutch MS patients. *Nutr Neurosci*, 1-8.  
425 <https://doi.org/10.1080/1028415X.2021.1885240>  
426

427 Fitzgerald, K. C., Tyry, T., Salter, A., Cofield, S. S., Cutter, G., Fox, R., & Marrie, R. A. (2018a).  
428 Diet quality is associated with disability and symptom severity in multiple sclerosis.  
429 *Neurology*, 90(1), e1-e11. <https://doi.org/10.1212/wnl.0000000000004768>  
430

431 Fitzgerald, K. C., Tyry, T., Salter, A., Cofield, S. S., Cutter, G., Fox, R. J., & Marrie, R. A. (2018b). A  
432 survey of dietary characteristics in a large population of people with multiple sclerosis. *Mult*  
433 *Scler Relat Disord*, 22, 12-18. <https://doi.org/10.1016/j.msard.2018.02.019>  
434

435 Grech, A. L., Rangan, A., & Allman-Farinelli, M. (2017). Dietary energy density in the Australian  
436 adult population from national nutrition surveys 1995 to 2012. *Journal of the Academy of*  
437 *Nutrition and Dietetics*, 117(12), 1887-1899.e1882.  
438 <https://doi.org/10.1016/j.jand.2017.08.121>  
439

440 Grech, L. B., Kiropoulos, L. A., Kirby, K. M., Butler, E., Paine, M., & Hester, R. (2016). Coping  
441 mediates and moderates the relationship between executive functions and psychological  
442 adjustment in multiple sclerosis. *Neuropsychology*, 30(3), 361-376.  
443 <https://doi.org/10.1037/neu0000256>  
444

445 Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic  
446 review of empirical tests. *Social science & medicine* 292, 114523-114523.  
447 <https://doi.org/10.1016/j.socscimed.2021.114523>  
448

449 Jakimovski, D., Guan, Y., Ramanathan, M., Weinstock-Guttman, B., & Zivadinov, R. (2019).  
450 Lifestyle-based modifiable risk factors in multiple sclerosis: review of experimental and  
451 clinical findings. *Neurodegenerative disease management*, 9(3). [https://doi.org/10.2217/nmt-](https://doi.org/10.2217/nmt-2018-0046)  
452 [2018-0046](https://doi.org/10.2217/nmt-2018-0046)  
453

454 Jelinek, G. (2010). *Overcoming Multiple Sclerosis. An Evidence-Based Guide to Recovery*. Allen &  
455 Unwin.  
456

457 Le Moal, F., Michaud, M., Hartwick-Pflaum, C. A., Middleton, G., Mallon, I., & Coveney, J. (2021).  
458 Beyond the normative family meal promotion: a narrative review of qualitative results about  
459 ordinary domestic commensality. *International Journal of Environmental Research and*  
460 *Public Health*, 18(6), 3186. <https://doi.org/10.3390/ijerph18063186>  
461

462 Leong, E. M., Semple, S. J., Angley, M., Siebert, W., Petkov, J., & McKinnon, R. A. (2009).  
463 Complementary and alternative medicines and dietary interventions in multiple sclerosis:  
464 What is being used in South Australia and why? *Complementary Therapies in Medicine*,  
465 17(4), 216-223. <https://doi.org/10.1016/j.ctim.2009.03.001>

466

467 Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample Size in Qualitative Interview  
468 Studies: Guided by Information Power. *Qual Health Res*, 26(13), 1753-1760.  
469 <https://doi.org/10.1177/1049732315617444>  
470

471 Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample Size in Qualitative Interview  
472 Studies: Guided by Information Power. *Qualitative Health Research*, 26(13), 1753-1760.  
473 <https://doi.org/10.1177/1049732315617444>  
474

475 Marck, C. H., Probst, Y., Chen, J., Taylor, B., & van der Mei, I. (2021). Dietary patterns and  
476 associations with health outcomes in Australian people with multiple sclerosis. *Eur J Clin*  
477 *Nutr.* <https://doi.org/10.1038/s41430-021-00864-y>  
478

479 Masullo, L., Papas, M. A., Cotugna, N., Baker, S., Mahoney, L., & Trabulsi, J. (2015).  
480 Complementary and alternative medicine use and nutrient intake among individuals with  
481 multiple sclerosis in the United States. *Journal of Community Health*, 40(1), 153-160.  
482 Masullo2015. <https://doi.org/10.1007/s10900-014-9913-z>  
483

484 McCabe, M., Ebacioni, K., Simmons, R. D., McDonald, E. I., & Melton, L. (2012). *A needs analysis*  
485 *of Australians with MS*. MS Australia. [https://msra.org.au/wp-](https://msra.org.au/wp-content/uploads/2016/03/National-MS-Needs-Analysis-2012-1.pdf)  
486 [content/uploads/2016/03/National-MS-Needs-Analysis-2012-1.pdf](https://msra.org.au/wp-content/uploads/2016/03/National-MS-Needs-Analysis-2012-1.pdf)  
487

488 MS Research Australia. (2020a). *Adapting your lifestyle: a guide for people with MS*. MS Research  
489 Australia. Retrieved 3 Feb, from [https://www.msaustralia.org.au/wp-](https://www.msaustralia.org.au/wp-content/uploads/2021/10/adapting-your-lifestyle-a-guide-for-people-with-ms.pdf)  
490 [content/uploads/2021/10/adapting-your-lifestyle-a-guide-for-people-with-ms.pdf](https://www.msaustralia.org.au/wp-content/uploads/2021/10/adapting-your-lifestyle-a-guide-for-people-with-ms.pdf)  
491

492 MS Research Australia. (2020b). *Modifiable Lifestyle Factors and MS. A Guide for Health*  
493 *Professionals*. MS Research Australia. Retrieved 3 Feb, from  
494 [https://www.msaustralia.org.au/wp-content/uploads/2021/10/modifiable-lifestyle-factors-and-](https://www.msaustralia.org.au/wp-content/uploads/2021/10/modifiable-lifestyle-factors-and-ms-a-guide-for-health-professionals.pdf)  
495 [ms-a-guide-for-health-professionals.pdf](https://www.msaustralia.org.au/wp-content/uploads/2021/10/modifiable-lifestyle-factors-and-ms-a-guide-for-health-professionals.pdf)  
496

497 National Health and Medical Research Council [NHMRC]. (2013). *Australian Dietary Guidelines*.  
498 National Health and Medical Research Council. Retrieved 3 Feb, from  
499 <https://www.nhmrc.gov.au/guidelines-publications/n55>  
500

501 Norwood, R., Cruwys, T., Chachay, V. S., & Sheffield, J. (2019). The psychological characteristics of  
502 people consuming vegetarian, vegan, paleo, gluten free and weight loss dietary patterns.  
503 *Obesity Science & Practice*, 5(2), 148-158. <https://doi.org/10.1002/osp4.325>  
504

505 Plow, M. A., & Golding, M. (2016). A qualitative study of multiple health behaviors in adults with  
506 multiple sclerosis. *International Journal of MS Care*, 18(5), 248-256.  
507 <https://doi.org/10.7224/1537-2073.2015-065>

508  
509 Pollard, C. M., Miller, M. R., Daly, A. M., Crouchley, K. E., O'Donoghue, K. J., Lang, A. J., &  
510 Binns, C. W. (2008). Increasing fruit and vegetable consumption: success of the Western  
511 Australian Go for 2&5@campaign. *Public Health Nutrition*, *11*(3), 314-320.  
512 <https://doi.org/10.1017/S1368980007000523>  
513  
514 Public Health England. (2016). *Government Dietary Recommendations*.  
515 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/618167/government_dietary_recommendations.pdf)  
516 [file/618167/government\\_dietary\\_recommendations.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/618167/government_dietary_recommendations.pdf)  
517  
518 Reich, D. S., Lucchinetti, C. F., & Calabresi, P. A. (2018). Multiple Sclerosis. *N Engl J Med*, *378*(2),  
519 169-180. <https://doi.org/10.1056/NEJMra1401483>  
520  
521 Ridoutt, B., Baird, D., Bastiaans, K., Hendrie, G., Riley, M., Sanguansri, P., Syrette, J., & Noakes, M.  
522 (2016). Changes in food intake in australia: comparing the 1995 and 2011 national nutrition  
523 survey results disaggregated into basic foods. *Foods*, *5*(2), 40.  
524 <https://doi.org/10.3390/foods5020040>  
525  
526 Ruggiano, N., & Perry, T. E. (2019). Conducting secondary analysis of qualitative data: should we,  
527 can we, and how? *Qualitative Social Work*, *18*(1), 81-97.  
528 <https://doi.org/10.1177/1473325017700701>  
529  
530 Russell, R. D., Black, L. J., & Begley, A. (2021). Navigating dietary advice for multiple sclerosis.  
531 *Health Expect*, *24*(3), 853-862. <https://doi.org/10.1111/hex.13226>  
532  
533 Russell, R. D., Black, L. J., Sherriff, J. L., & Begley, A. (2018). Dietary responses to a multiple  
534 sclerosis diagnosis: a qualitative study. *Eur J Clin Nutr*, *73*(4), 601-608.  
535 <https://doi.org/10.1038/s41430-018-0252-5>  
536  
537 Russell, R. D., Lucas, R. M., Brennan, V., Sherriff, J. L., Begley, A., The Ausimmune Investigator  
538 Group, & Black, L. J. (2018). Reported changes in dietary behavior following a first clinical  
539 diagnosis of central nervous system demyelination. *Front Neurol*, *9*(161), 1-7.  
540 <https://doi.org/10.3389/fneur.2018.00161>  
541  
542 Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C.  
543 (2018). Saturation in qualitative research: exploring its conceptualization and  
544 operationalization. *Quality & Quantity*, *52*(4), 1893-1907. [https://doi.org/10.1007/s11135-](https://doi.org/10.1007/s11135-017-0574-8)  
545 [017-0574-8](https://doi.org/10.1007/s11135-017-0574-8)  
546  
547 Sherif, V. (2018). Evaluating preexisting qualitative research data for secondary analysis. *Forum:*  
548 *Qualitative Social Research*, *19*(2). <https://doi.org/10.17169/fqs-19.2.2821>  
549

- 550 Smith, E., Stevenson, R., Dudley, L., & Francis, H. (2022). The relationship of health-related  
551 expectancies, fruit and vegetable intake, and positive mood: expectancies are important, but  
552 not in the way you expect. *British Food Journal*, 124(3), 885-897.  
553 <https://doi.org/10.1108/BFJ-03-2021-0289>  
554
- 555 Soelberg Sorensen, P., Giovannoni, G., Montalban, X., Thalheim, C., Zaratin, P., & Comi, G. (2019).  
556 The multiple sclerosis care unit. *Multiple Sclerosis Journal*, 25(5), 627-636.  
557 <https://doi.org/10.1177/1352458518807082>  
558
- 559 Swank, R. L. (1970). Multiple sclerosis: Twenty years on low fat diet. *Archives of Neurology*, 23(5),  
560 460-474. <https://doi.org/10.1001/archneur.1970.00480290080009>  
561
- 562 Swift, J. A., & Tischler, V. (2010). Qualitative research in nutrition and dietetics: getting started. 23,  
563 559-566. <https://doi.org/10.1111/j.1365-277X.2010.01116.x>  
564
- 565 Thompson, A. J., Baranzini, S. E., J., G., Hemmer, B., & Ciccarelli, O. (2018). Multiple sclerosis. *The*  
566 *Lancet*, 391(10130), 1622-1636. [https://doi.org/10.1016/S0140-6736\(18\)30481-1](https://doi.org/10.1016/S0140-6736(18)30481-1)  
567
- 568 Titcomb, T. J., Brooks, L., Smith, K. L., Ten Eyck, P., Rubenstein, L. M., Wahls, T. L., & Snetselaar,  
569 L. G. (2021). Change in Micronutrient Intake among People with Relapsing-Remitting  
570 Multiple Sclerosis Adapting the Swank and Wahls Diets: An Analysis of Weighed Food  
571 Records. *Nutrients*, 13(10). <https://doi.org/10.3390/nu13103507>  
572
- 573 Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research  
574 (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for*  
575 *Quality in Health Care*, 19(6), 349-357. <https://doi.org/10.1093/intqhc/mzm042>  
576
- 577 Tredinnick, A. R., & Probst, Y. C. (2020). Evaluating the effects of dietary interventions on disease  
578 progression and symptoms of adults with multiple sclerosis: an umbrella review. *Adv Nutr*,  
579 11(6), 1603-1615. <https://doi.org/10.1093/advances/nmaa063>  
580
- 581 United States Department of Health and Human Services, & Agriculture., U. S. D. o. (2020). *Dietary*  
582 *Guidelines for Americans, 2020-2025*. [https://www.dietaryguidelines.gov/resources/2020-](https://www.dietaryguidelines.gov/resources/2020-2025-dietary-guidelines-online-materials)  
583 [2025-dietary-guidelines-online-materials](https://www.dietaryguidelines.gov/resources/2020-2025-dietary-guidelines-online-materials)  
584
- 585 Wahls, T., & Anderson, E. (2014). *The Wahls Protocol. A Radical New Way to Treat All Chronic*  
586 *Autoimmune Conditions Using Paleo Principles*. Penguin Group.  
587
- 588 Wahls, T. L., Titcomb, T. J., Bisht, B., Eyck, P. T., Rubenstein, L. M., Carr, L. J., Darling, W. G.,  
589 Hoth, K. F., Kamholz, J., & Snetselaar, L. G. (2021). Impact of the Swank and Wahls  
590 elimination dietary interventions on fatigue and quality of life in relapsing-remitting multiple  
591 sclerosis: The WAVES randomized parallel-arm clinical trial. *Multiple sclerosis journal* -

592 *experimental, translational and clinical*, 7(3), 20552173211035399-20552173211035399.  
593 <https://doi.org/10.1177/20552173211035399>

594

595 Williams, V., Boylan, A.-M., & Nunan, D. (2020). Critical appraisal of qualitative research: necessity,  
596 partialities and the issue of bias. *BMJ Evidence-Based Medicine*, 25(1), 9-11.

597 <https://doi.org/10.1136/bmjebm-2018-111132>

598

599

600

## 601 **Acknowledgements**

602 We thank the participants and MSWA for their assistance in recruiting and the use of their  
603 venues.

## 604 **Source of funding**

605 Author 2 is supported by an Australian Government Research Training Program Scholarship,  
606 an MS Western Australia (MSWA) PhD Top-Up Scholarship, and a Graduate Women (WA)  
607 Open Scholarship. Author 3 is supported by MSWA, an MS Australia Postdoctoral Fellowship  
608 and a BLANK University Research Fellowship. Funders had no role in the conceptualisation  
609 or creation of this study.